COAL AGE

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To All Coal-Mining Men

AT PRESENT the coal industry is in a position to support only one large paper devoted to its interests. Careful observation and actual experience have proved this fact. Two papers were attempting to cover the field—**The Colliery Engineer** as a monthly and **Coal Age** as a weekly. Each accomplished much, and the total effort of both acting independently was considerable, but there was a large loss due to an overlapping of fields.

Those readers who were desirous of missing nothing paid for both papers and received in return a duplication of articles that was, to say the least, not pleasing. The subscribers to only one of the two papers necessarily failed to keep themselves fully informed.

The logical thing has happened—**Coal Age,** with its youth, aggressiveness, broader field and greater comparative investment, has combined with **The Colliery Engineer.** The younger journal needed the age and prestige of its staid and sturdy contemporary.

Of the ten men who now fill the more important positions on the editorial and business staffs of the new paper that results from the consolidation, five were formerly employed by **The Colliery Engineer,** which fact makes it plain that the combine was actually a consolidation and not an absorption.

The new plans of this enlarged paper cannot be stated on a single page. However, they call for a continuation of each and every good feature of both journals. Any added income will go toward covering the cost of a more detailed editorial campaign designed to make **Coal Age** and **The Colliery Engineer** as one paper the most complete and the most satisfying engineering and trade journal in the world.

We want you to say: "If it wasn't in **Coal Age** it didn't happen."

The new paper will have 39 regular and staff contributors. These men are located in every important American coal-mining and fuel-consuming center. Two of them are in Europe and two in Canada gathering news and covering important coal developments. One man is traveling in South America, materializing dreams of foreign circulation in a market that will soon belong to American producers.

One member of the **Coal Age** staff is a lawyer—he handles all legal questions. Another is a doctor versed in first-aid and competent to advise along medical lines.

Five editors are graduate mining engineers of varied experience. Another member of the regular staff is a mechanical engineer who devotes his time exclusively to questions along mechanical and electrical lines.

If you want to know about a problem in law as it affects coal mining, a lawyer will tell you; if it's a question in medicine as it relates to first-aid or resuscitation, you will be advised by a doctor. Pump problems go to a specialist; so do questions on ventilation, gases, surveying, roof support, sociology, mining and the like.

In behalf of **Coal Age** we warmly welcome readers and friends of **The Colliery Engineer.** We will please you if you are interested in coal literature. You will pay us very little more, and in return will receive annually about 2,200 pages of carefully edited information, which compares with less than 700 pages you have heretofore been receiving. We invite you to contribute to our paper and to enter into our discussions. There is no reason why you should not receive a share of the $20,000 we pay for articles and news each year.

You old readers of **Coal Age**—in behalf of **The Colliery Engineer,** we bid for your friendship. As the oldest of all coal papers, it brings you something in the way of ripe experience that even the enthusiasm of youth can't duplicate. It brings you its loyal friends, many grown gray in the service; and what can improve on the winning qualities of seasoned experience when it is combined with the courage, energy and freshness of youth?

Ideas and Suggestions

Efficiency Index for Coal Mines

By Sheldon Smillie*

After a mine manager has solved all the knotty little individual problems of the mines under his control and things begin to work smoothly, he begins to wonder how his mines compare with other mines in his vicinity, whether better or worse and how much so. A knowledge of this would offer a direct line of attack for the improvement of his operation. Costs may be compared, but the large variety of methods employed and in many places their crudity make them of rather uncertain value, and in most cases a company is rather loath to impart this information.

Labor represents by far the largest percentage of the cost of production, and the most important feature therefore for the manager to know is whether his labor returns him as much as does that of his competitors. A recent writer has suggested a "labor factor," the ratio of the number of company men to the tonnage produced. This gives certain valuable comparisons for the immediate vicinity where the labor conditions may be all the same, but is subject to fluctuations in comparisons between all pick, puncher, shortwall and longwall mining, according to the division drawn between miners and others.

Efficiency of the daymen may be high, but the miners and loaders may be waiting for cars and not working to the best advantage. An extra employee here and there inside may not in himself be working to the best of his time, but he may be helping the miners to double their output. A better basis of comparison would appear to be one involving the output per man employed inside.

An Interesting Comparison

Some time ago I made up the accompanying table showing a comparison between the largest producers in the central Pennsylvania field operating on the thinner seams of coal, the Freeports and Kittannings, from data taken from the state mine inspector's report. These figures may be inaccurate in minor details, but are probably equally correct for all. The collieries are arranged according to the thickness of the seam, and the final tonnage is divided by the thickness of the seam in feet, so as to put all on an even basis. While the thickness of the seam does not affect the day labor as much as the miner, it does to a certain extent affect the former, for the thicker seams make fewer cars to handle per ton.

It will be noticed that there is a wide variation in the tonnage handled by the men outside the mine. This is to be expected, as conditions vary more widely outside than inside, the matter of picking probably having more influence than any other. Some companies purchase power, but I believe most of those on the list are so large they have found it economical to produce their own or are producing it, because their plants were installed before it was convenient to purchase power. All employees engaged in the manufacture of coke have been eliminated. With a general knowledge of the conditions existing in each case, a fairly reliable comparison should be reached.

PRODUCTION EFFICIENCY OF VARIOUS COMPANIES IN CENTRAL PENNSYLVANIA
Compiled from Mine Inspector's 1912 Report

Thickness of Coal, In.	Company	Tons per Man per Day — Inside	Outside	Inside and Outside	Foot-Tons	Standing
38	A	....	....	2.27	0.72	12
40	B	3.45	19.3	2.91	0.87	6
42	C	4.43	21.3	3.60	1.28	1
..	D	3.56	28.1	3.16	0.90	3
..	E	2.72	30.4	2.50	0.71	13
45	F	3.96	45.2	3.65	0.97	2
46	G	3.68	43.3	3.40	0.89	5
48	H	4.06	31.7	3.60	0.90	4
..	I	3.53	87.0	3.39	0.85	7
..	J	2.92	11.1	2.31	0.46	18
56	K	4.67	25.8	3.95	0.84	9
58	L	4.73	14.3	3.56	0.73	11
60	M	4.12	36.5	3.70	0.74	10
..	N	4.15	16.4	3.31	0.66	15
66	O	5.53	30.3	4.68	0.85	8
67	P	3.90	25.7	3.40	0.61	16
72	Q	4.77	34.4	4.12	0.68	14
..	R	4.27	20.7	3.52	0.58	17
Average.....			30.1		0.79	

In offering the above table which I shall call an "efficiency index," I do not consider that an absolute basis of comparison is reached, but merely one more satisfactory than any I have so far seen, and I hope that by starting a discussion of the subject more light may be shed on it.

*Indiana, Penn.

Mine Maps vs. Mine Sketches

By H. L. Fickett*

The laws of every state in which coal is mined require that periodically the operating companies file with the chief mine inspector certified maps of the workings of the mines operated by them. The object of such laws is obvious. These maps are the records by means of which the state will be able to estimate the amount of its mineral wealth consumed and to which posterity in time to come will refer for information.

The importance of these documents cannot be overlooked. Yet it is a well-known fact that many of the maps submitted are in reality but mere sketches, often beautiful from the viewpoint of the draftsman, but owing to abounding inaccuracies practically worthless to the operators.

In such sketches the letter of the law has been fulfilled, but the spirit has been neglected. Large companies have long since come to realize the value of accurate maps, because at some time in their career one of these sketches has caused the expenditure of thousands of dollars that would have been saved if the information had been reliable. Hence these suggestions are more to the small operator, with the hope that he may realize that to neglect or slight his maps is not economy, but extravagance in the long run.

Since the coal companies' stock in trade is the coal that lies beneath the ground, it is important that they, like the merchants, keep an accurate record of that which is

*Belle Ellen, Ala.

taken out and that which is left. Their maps furnish the only means of taking an inventory. If they have been accurately made, at the end of their examination of the maps the operators will know as much concerning their assets as the merchant who has been able to see and to touch each article in his establishment.

The nature of mining makes it impossible after a short time to inspect the workings, especially if there has been any robbing. Then it is that the map asserts its value and furnishes the best means for locating blocks of coal that have been left untouched. Such maps are also valuable in the location of new haulways and in the execution of other improvements. If the map is what it should be, no difficulty will be encountered in carrying out the plans successfully, but if it is not, the loss of time and money may be appalling.

Losses Owing to Incomplete Mine Plans

A poor map is often the result of the operator's idea that if a contracting engineer visits the mine only once or twice each year for a couple of days and makes a map that will pass the inspector he possesses something that supplies his needs. The requirements of the present have been met, and the average cost per ton of coal for the year has been reduced by not having a regular force to look after the mapping of the mine.

But the future has been neglected. Such methods were pursued by a certain small company. They had a number of men to make extensions on their map about once each year, always making it plain that the least time spent at the plant the better. When, after the mine had been in operation for a number of years, a new short-cut haulway had to be installed, it was found that their map was not worth the paper it was printed on. New surveys had to be made and a new map plotted of the area through which the new slope was to go. The price of the new work was a loss, since an accurate map would have furnished the necessary information.

Another instance was that of a company operating a block of coal on a lease. The engineering department was looked upon as a luxury and maps as an extravagance. After the mine had been worked out and the pillars drawn, the owners claimed that they had not received enough royalty and filed suit for a large amount. Tipple weights had been misplaced, and the only document upon which a settlement could be made was the map, which because of the views of the operators had been poorly kept. It was not even an approximation.

The attorneys, not knowing the accuracy of the map, agreed to leave it to competent engineers to figure from the map the tonnage obtained. This was done, with the result that the operating company paid out thousands of dollars in royalty for coal that was never mined owing to the existence of unfavorable conditions, but which was shown as extracted by a mere sketch that bore the dignified title of "mine map."

Blocks of coal have been left because there was no available information as to how to recover them. Money has been spent looking for pillars that have been drawn, but are shown to be in place. And instances of mines being drowned out by cutting into old workings not recorded or shown at a safe distance are familiar to all.

Keeping in mind the old adage that "anything that is worth doing at all is worth doing well," the engineer should take pride in making his maps accurate. It is the practice of too many engineers to go into the mines with but one idea in view—that of getting out as quickly as possible. Their haste causes the oversight of important details that ought to be recorded. They forget that their time is not their own, but is the property of the company which retains them. They run accurate transit lines in each heading, then offset their careful work by measuring rooms in a careless manner. Since by far the greater territory is worked by rooms, it is important that these be not only measured, but located carefully.

There is not an engineer who would go into a mine and be content with getting the bearing of each room and then plotting the bearings on his map. Still there are many who rush into the mine and are content with getting distances without bearings, never thinking that for the purpose of accurate work distances without bearings are as useless as bearings without distances. Bearings may be determined with the magnetic compass, but the results are always more or less unsatisfactory owing to the presence of attracting forces that cause the needle to vary. There is still a better method.

Some Suggestions

That method is to first decide upon a plan for working a mine or for working each section of a mine if such is necessary. Then have everything driven on centers according to the accepted plan. All rooms should be measured carefully shortly after they have been worked out. Offsets should be taken to the ribs at regular intervals, and also where irregularities in the working places demand them. If a place is stopped before it has been driven to its working limit, it is a good plan to note on the map the reason for stopping it. Then in the future anyone who examines the map may understand immediately why each block of coal was not taken out in the order of its development.

Where the mines are in a seam of varying thickness it is a good plan to note the thickness of the seam at regular intervals. Every bit of information that can be placed on a map will become more valuable as time passes, and the map will be more useful to those whose capital has purchased it. Service should be the watchword of every engineer. It is a good plan to take the map and a scale and check the tipple weights for a year, by finding the volume extracted and multiplying this amount by the weight of the coal per cubic foot. If the map is correct, it should check the output over the selected time within a small percentage.

In conclusion, let it be said that the mine map should be kept with all the care of a set of books, and each mark on a map, like each figure in a trial balance, should be correct and should have a definite meaning. The engineer should devote as much of his time to making a good map as to executing a piece of construction that is to serve the company for years to come.

Let there be more good maps and less sketches, for the difference in the cost of a good map and a sketch is small, while the difference in value between the two may amount to thousands of dollars. Let the small operator realize that a map is more than a parchment exacted by a tyrannical legislature—it is something of tangible value, worth dollars and cents, to be prepared carefully, kept safely and consulted frequently.

Modern Mine-Plant Design--I

By M. L. Hyde*

SYNOPSIS—The most advantageous arrangement of surface works at a coal mine is a perplexing problem. This article, which is the first of two on this subject, advocates an arrangement of buildings which has many obvious advantages, but which is a decided departure from American practice.

These articles are addressed to the official who is facing the problem of designing, constructing and operating a modern mining plant—a plant to meet not only the exacting demands of today, but one with an elasticity that will allow of its conquering any phase of future market requirements.

A reasonable first cost, combined with the lowest operating and maintenance expenses, ease of extension, safety and sightliness, are to be secured; and in this day of radical improvements, it is indeed hard to feel that the accepted designs will prove efficient 20 years hence.

The line between good and bad design is a clearly marked one to the specialist, with fortunately a wide choice of properly designed and fabricated equipment, but with little margin so far as correct arrangement of units or assembly of elements is concerned.

Where equipment is to be purchased, it is often the custom to call in several manufacturers with the request that they furnish competitive designs and tenders. From these the best points are culled and a final design offered for bids. Such a proceeding is most unfair to the original bidders, is not good business and usually defeats its own purpose. Specifications while seeming to cover all points of each item as desired may yet prove far from satisfactory. As a rule it is safe to assume that any marked difference in first cost will be compensated by poorer workmanship, materials and details and will in the end prove an expensive bargain. Consultation with a specialist would have avoided such a result.

It is intended here to cover only the general features of plant design, but so far as possible all items of equipment will be specified to be of a given make or its equal. This is with no thought of influencing the purchaser, but merely that a standard of the highest type may be set.

In the layout described, a capacity of from 1,000 to 3,000 tons per day has been taken as covering the average mine output. The location of each unit represents careful study, and each has been set relative to its importance in the daily operative routine: for a mine is an organization of absolute routine, governed from beginning to end of shift by fixed laws, which must be observed in every detail. Men, coal and supplies are daily handled over specified courses, and in this process success calls for minimums in distances and in energy expended. Not only must the routine of operation be solved, but that of idleness as well, be the cause of such idleness lack of market, fire, strikes, accidents, or what it may.

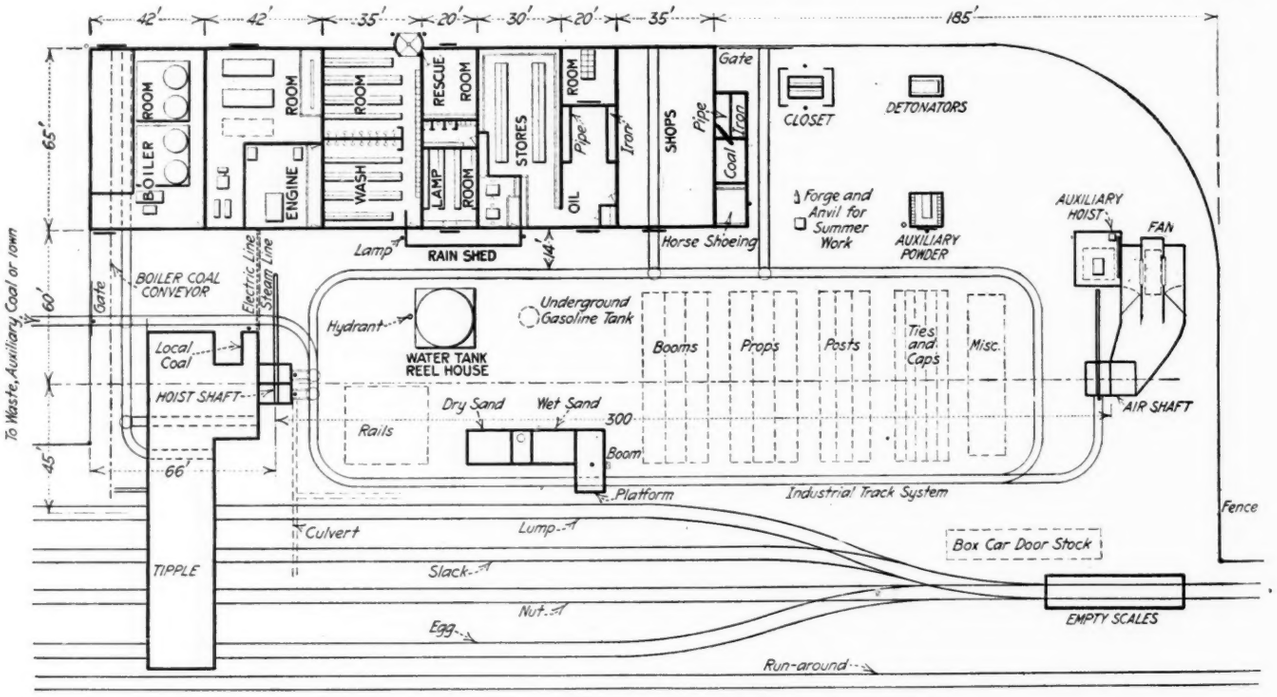


FIG. 1. GENERAL ARRANGEMENT OF MINE BUILDINGS

Concentration of Units Is Advantageous

Concentration is the golden rule to be followed in the general layout. Short distances allow of easier fire protection, inspection, upkeep and moving of men and supplies than can be realized from a haphazard, sprawled-out design.

*Pembina Coal Co., Evansburgh, Alta.

A rectangular yard with a central lane dividing it the long way meets nicely the conditions imposed. Lights and hydrants on this lane facilitate the watchman's duty, allow of lighting the entire plant at a minimum cost and force all travel over one course. A stout wire fence, 8 ft. in height, should surround the yard, with lights placed at each corner.

Two industrial track systems are required—an inside one for handling damaged cars, machines, locomotives, general supplies, etc., and an outside system for handling coal to the houses, ashes from the boilers, waste from the tipple or houses, powder from the magazine and for delivering store supplies. A boy with a gasoline locomotive on these systems displaces from one to two teams, with a corresponding saving.

The determining factor of a satisfactory layout is the handling of men, coal and supplies. All employees should enter the works through the washroom, where they change clothes, proceeding thence to the lamproom for lamp and check, to the overman's office for instructions, to the auxiliary powder magazine for powder canister, to the shop for sharpened tools, and finally to the mine, after hanging their checks on the tally board. During this time they should not have had to step off the lane.

Coming from the mine, a man first removes his check from the tally board, deposits check and lamp at the lamproom and gives in his time at the office, his dull tools at the shop and his empty or partly empty powder canister at the magazine. He then goes direct to the washroom for bath and change and from the washroom to the outside. This avoids confusion and encourages promptitude and cleanliness on the part of the men, in the care both of their persons and of the company's property. With one or two waste barrels on the lane, the necessity of throwing fruit skins, burned-out carbide or cigar butts on the ground is eliminated.

The outer door to the washroom should be open, and an attendant should be on duty at all hours. The inner door leading to the works must be locked during shutdowns and the key be placed in charge of the attendant. This man then sees every person attempting to enter the plant, and by having him appointed a deputy, perfect control is secured. Just off the central lane should be placed a water-closet for the use of men and officers.

The handling and preparation of coal for market has been covered in previous articles.

Power-plant coal for boiler or producer consumption should be taken by a cable conveyor direct to bunkers supplying these units.

Local or house coal should be discharged from the tipple direct to a car on the outside industrial track and thence be pulled by a locomotive to the house for which it is destined. Arrangements must also be made to allow of the tipple boss admitting and loading wagons for local supply. Whether cars or wagons are loaded, the bin should be so located that in getting their load these do not interfere in any way with the routine of the plant nor come in contact with any of the workmen.

Blacksmith and sand-drier coal should be unloaded first from the tipple to cars on the inside industrial tracks and thence transferred to bins.

Careful Arrangements Are Required

Supplies are generally purchased in much greater quantities than needed for immediate use and therefore require a minimum of two handlings—from car to storage and from storage to point of application. Here every facility should be afforded for economical work.

Rails are the heaviest commodity daily used, and their storage must be at such a point that they can be skidded from the car to stock and from stock lifted to the cage for lowering.

Next in importance are the mine timbers—ties, props, caps, etc. In storing these the element of fire hazard enters, and at least 100-ft. clearance between stocks and the hoist shaft is required. All timbers should be unloaded direct from cars to stock and thence to mine cars, with one handling in each case.

Moderately heavy supplies that are usually piled on top of one another—such as ropes, cement, lime, fire-clay, roofing, etc., or bar iron and pipes which are stocked in racks—should be unloaded to a partitioned section of the storeroom, having overhead trolley service from the car to the warehouse interior. The same applies to barrels of oil, with the exception that a fireproof partition should separate the two stocks.

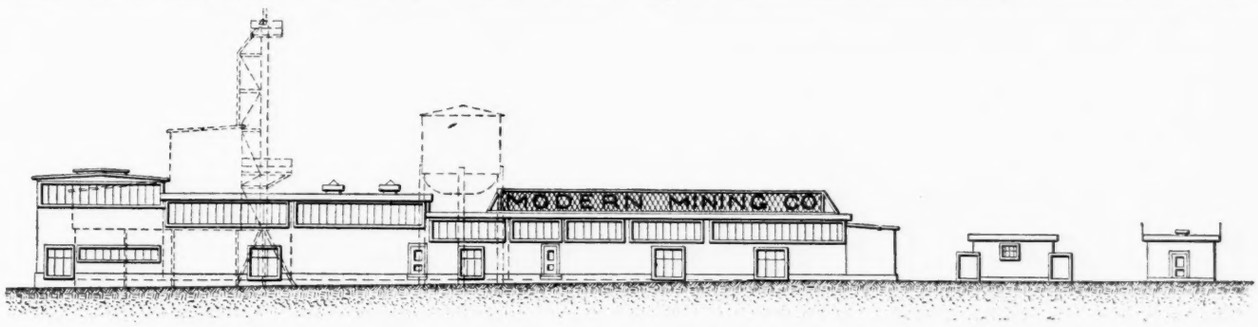


FIG. 2. SIDE VIEW OF MINE BUILDINGS

General supplies—such as paints, nails, waste, electric, mechanical and plumbing fittings, machine repairs, etc., that are carried in bins or on shelves—are handled from railroad cars to the inside industrial system and thence to the main storehouse.

Supplies that are seldom used—such as building lumber, heavy framing, brick, second-hand machinery, etc.—may be stored in one corner of the yard where they will not interfere with those more in demand and yet receive the benefit of industrial track service.

For unloading mine cars, machines, locomotives, heavy repairs, etc., a 12-ton mast and boom is required at the unloading platform. It should have sufficient swing to lift from the railroad car to the industrial track.

Sand for mine locomotives, if received in a wet condition, must go from the car to the wet storage with

one shoveling; thence it passes through the drier to the dry bin enjoying the industrial-track service.

Scrap iron from the shop and ashes from the forge and drier are sent to waste or storage piles over the shortest paths. Ashes from the power plant are pulled out in cars running in a tunnel below the boilers or producers to the common waste track serving the waste bins under the tipple. The lump-coal boxcar-loader runner operates, during lulls in coal loading, a three-drum electric hoist placed adjacent to his loader. One drum on this hoist pulls ash cars from the power plant, another handles all cars on the waste-pile trestle, and the third is used for railroad cars in the yard. By means of turntables, cars conveying ashes or garbage from the houses may be sent to the waste pile.

The main powder magazine is located at the end of the waste yard, with industrial service for filling or emptying.

Carefully laid-out grades, ample drainage, 80-lb. steel with creosoted ties on 24-in. centers, heavy ballast, as few turns as possible against the locomotive pulling out

Playgrounds, clubhouse, ballfields, etc., should be at the far end of the town, and every effort should be made to group the houses so that each employee has the shortest possible distance to traverse in his share of the daily routine. While winding boulevards enhance the beauty of a mining village, straight lines are just as pleasing and rent charges are materially in their favor.

The plant inclosure should be east and west, if possible, with the waste piles at the opposite end from the direction of prevailing winds. The townsite should extend either to the north or south.

All Building Units Should Be Under One Roof

Individual buildings housing individual units can no more compete with the low first cost and operating expense of the general departmental unit than can individual stores compete with the large department store.

Too much emphasis cannot be laid on this point. No operator should consider a layout in which, provided the ground surface is suitable, the boiler room, engine room, washroom, lamproom, rescue station, warehouse, over-

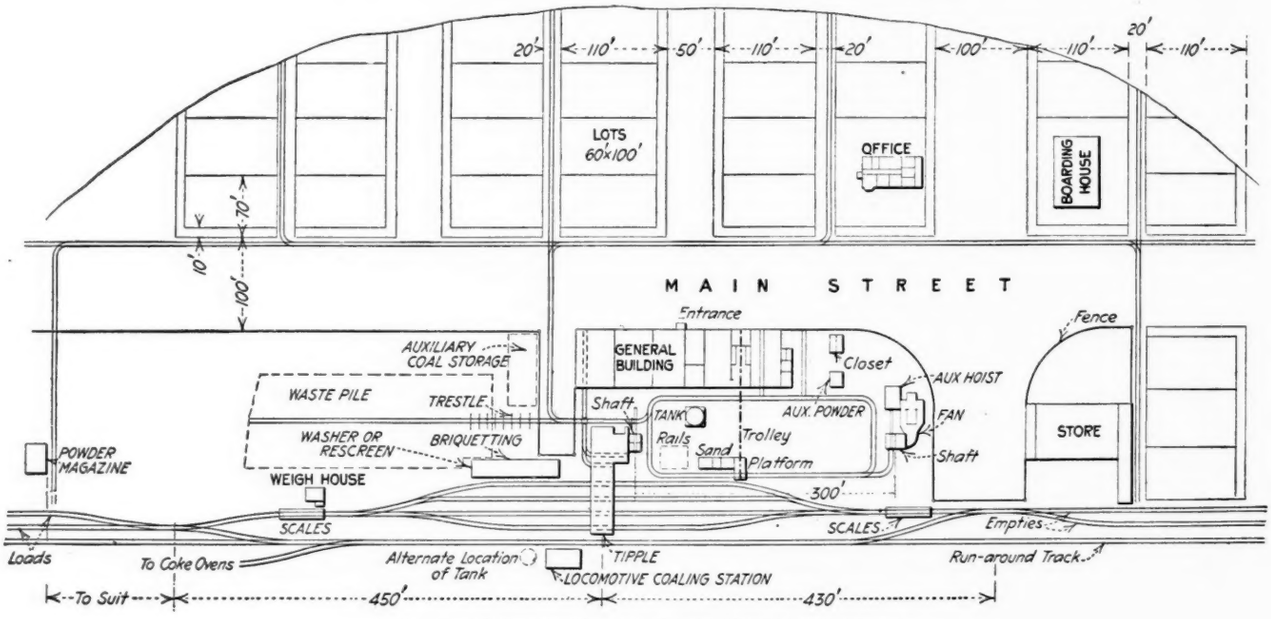


FIG. 3. ARRANGEMENT OF PLANT AND TOWN

trips of loads, switches coming together at given points, not over two switches to be thrown for spotting empties on any given grade track, and an average storage of four empties on each track under the tipple—all these are the essential features of a well-laid-out railroad yard. The ladder or scissors track layout at the tipple is not recommended.

The Store Should Be Served by Both Industrial and Railroad Tracks

The store, if run by the company, should be located adjacent to the empty storage yard for cars, enabling carload lots of merchandise to be handled direct. It should be accessible to men coming or going from work, be near to the main office and should enjoy service over the outside industrial track.

The mine office should overlook the plant, with the superintendent's room so placed that the entrance to the plant and the moving of cars may be seen from his desk.

man's office, oilroom and shops are not under one roof; and, barring powder or detonator magazines, this applies to any other units required.

The first cost, space occupied, maintenance and operating expense are all less, while heating, ventilation, draining, lighting, plumbing, inspecting and protecting from fire or other damages are materially simplified.

For a long life, with low first cost and upkeep expense, pleasing lines and general desirability, a steel skeleton set on 8-in. concrete foundation walls, with flat roofs carried on beams, free of trusswork of all kinds, and covered, sided and partitioned with hy-rib and 2-in. cement plaster, is the solution. This construction requires no painting on the outside, is bright and cheerful on the inside, easily heated, cooled, cleaned or fumigated, is vermin-proof and fireproof, and in every way gives a combination ideally suited to the coal mine.

Foundation walls should be continuous and rise 12 in. above the highest grading on which the building is to

stand, with a 6-in. vitrified tile drain placed outside of and along the base below the frost line.

Barrett specification roof laid direct on the plaster is recommended. The Sturtevant hot-blast system of heating and ventilating is of the simplest and most efficient variety. The hot-blast fan may be set on an elevated platform over the draft fan in the boiler room and driven from a secondary pulley keyed on the draft-fan engine shaft.

This system furnishes fresh warm air under perfect control, the apparatus is under the fireman's care and as the pipes carry only air at a low pressure, the risk from freezing, leaks, etc., resulting from steam or hot-water radiators is avoided. The washroom is particularly well served, owing to the uniform temperatures obtainable, the freedom from drafts and the continual replacing of the vitiated air with fresh, resulting in the quick drying of damp clothes.

The lighting should be of the best. Hinged sash placed just below the roof lines throws the light downward, with an even diffusion, the windows being so located that danger of breaking them is minimized. This arrangement, coupled with tungsten bulbs placed where needed, will meet both day and night demands.

Such units as the engine room, boiler room and washhouse, all of which require plumbing, should be placed adjacent to each other, while the shops should be so located that they are lighted from three sides. The building illustrated will house an equipment for a mine with a capacity up to 2,500 to 3,000 tons per day. For a larger tonnage the width may be increased. For unforeseen additions to the original capacity any or all rooms may be lengthened to suit.

To ascertain the size of plant necessary, a great many conditions must be studied. Among these are the average horsepower required by the shaft when hoisting; the number of mining machines to be used and the power required by each; the number of trolley locomotives, weight of trips, grades, etc.; the number of battery locomotives; the number of drills; the number of pumps and the capacity and lift of each; the power requirements of the fan, tipple, boxcar loaders, shops, deep-well pumps, power plant, coal conveyor, ash- and waste-handling systems, town lighting, etc.

Three Power Sources Are Available

The choice between steam, gas or a public power supply must be made. Strong claims are put forward by electrical engineers and others concerning the many advantages to be derived from purchasing current from a public supply as against manufacturing it at the mine. But before a public-supply contract is signed, the specialists in both gas and steam should be consulted and allowed an opportunity of showing the advantages of their respective powers.

Current is seldom sold at less than from ¾c. to 1c. per kw.-hr. It is invariably metered before passing to the motors, and because of the internal resistance of these machines, part of the current is absorbed in the machine itself. This gives a good motor about 85 per cent. actual efficiency and makes the cost 0.88c. to 1.17c. for each kw.-hr. available for useful work. This is the price that should be considered in any comparison made.

As competition grows stronger, economy in the use of the mine's product will grow greater. The market shows more and more a preference for the smaller grades of coal as new methods of burning them are developed. All this forces the conclusion that, to survive, the operator must install a system in which can be used either byproducts direct or such grades of coal as are unmarketable, preference being given to that arrangement which, other things being equal, can utilize either waste gases from the coke ovens or high-ash coal or bone from the picking tables.

The modern mine is in a position to maintain both day and night loads within fairly reasonable limits. During the day the tipple, fan and pumps offer a uniform load; and by running express trains on schedule, the trolley locomotives may be timed to minimize the peaks as far as possible. During the night the battery locomotives under charge, pumps, fan and lights are uniform, with the mining machines tending to create sudden fluctuations. As both trolley locomotives and mining machines do not have to be contended with on the same shift, but small difficulty should be encountered in handling such peaks as arise, be the power either steam or gas.

In making a comparison between steam and gas for mining work, the capacity of the plant is assumed to range from 400 to 1,000 kw. The gas equipment would then consist of the Smith Gas Power Co.'s updraft producers and cleaning apparatus and the Mather & Platt, Ltd., vertical double-acting valveless engines. A steam plant of the size assumed should embody the best type of water-tube boilers, fitted with superheaters and stokers, and steam turbines driving the electric generators.

Comparative Efficiencies and Costs

In general the efficiency of a modern mine steam plant is somewhat less than that of a gas plant of the same size. A steam plant equipped as specified will cost slightly less than the gas plant, unless byproduct gas from the ovens may be used, doing away with producers, in which case the steam plant would be the more expensive.

Using the same coal- and ash-handling systems, operating costs will be approximately the same. One fireman on each shift can handle either four producers or four boilers, while one engineer can care for the engine room. In each case the gas attendant has the more pleasant job. Boilers require cleaning regularly; producers may go for two or three years without their fires being drawn. The valveless vertical engine gives no more trouble than the steam turbine, while the high-speed turbo-driven generator may be assumed to require more attention than the slow-speed engine-driven unit.

Oil and waste charges will be the same in either case. Depreciation should show in favor of the producer against the boiler and the turbine against the engine, balancing this item. Interest will also be the same. Coal and water costs will be in favor of gas.

Producers meet the requirements of the underwriters, and there is no more danger to be feared from them than from water-tube boilers; both require reasonable care.

There is no gas-storage tank, and the amount of gas contained in the pipes and coolers at any one time is not sufficient to cause a serious explosion, assuming an explosive mixture could get into the line and be ignited. If the water were shut off from the producer for one or two hours, no serious effect would be noticed other than the poorness in the quality of the gas.

A producer is nothing but a circular steel shell with firebrick lining. It has no tubes, is easier to fire than boilers, is much smaller and is more easily maintained.

The gas cleaning equipment of coolers, or condensers, tar and moisture extractors is made up of plain circular tanks, than which nothing could be simpler. The exhauster consists of motor-driven rotors in a heavy housing, smaller in size and just as simple as the draft fan for a steam plant. The piping carries a clean, cool gas at a low pressure, is relatively small, uncovered and requires no special valves or packing.

The turbine is undoubtedly the simplest prime mover obtainable, yet the gas engine designated is a close second in this respect. It has neither admission nor exhaust valves, cams nor gearing. The jackets are not cast on, and there is no danger from cylinder cracks.

Producers are guaranteed for 20 per cent. overload for two hours, and in many cases are run continuously at 50 to 75 per cent. overload. They cannot, however, carry the excessive overloads of 200 to 300 per cent. taken by the modern forced-draft boiler, owing to the high heats generated fusing the ash and requiring an increased amount of manual labor to break the clinker formed. Their range is sufficient, however, to meet the requirements of any well-regulated mine.

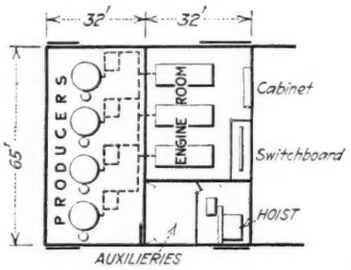


FIG. 4. PLAN OF GAS PLANT

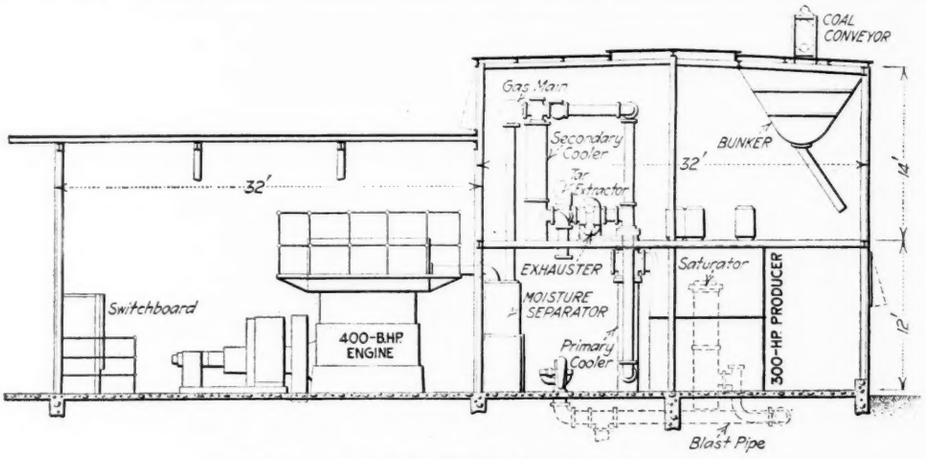


FIG. 5. CROSS-SECTION OF GAS PLANT

Standby Losses Are Less with the Gas Plant

When a producer is shut down the gas outlet to the atmosphere is opened, all inlets to the ashpit are closed, and 5 per cent. of the fuel used for rated load is required to keep the producer in shape for starting. This allows of keeping the fire reasonably hot and starting up in from 45 min. to 1 hr. Producers can stand for an indefinite period, provided coal is charged every 8 hr. to compensate the standby losses.

The lowest grades of lignite and the high-ash bituminous waste can both be gasified and a good efficiency realized. It may be said that, with the use of bone carrying from 25 to 30 per cent. ash, 1 hp. can be delivered from a producer with about the same quantity of fuel that a boiler would require of a good marketable grade.

In a plant such as described the ashes are withdrawn through low ash doors and shoveled to cars. No special system is necessary for the moderate sized plant. Assuming 1,200 hp. at 1½ lb. of poor coal with 15 per cent. ash per horsepower-hour, operating 16 hr. at full load and 8 hr. standby, 15 tons of coal will be used, giving 2½ tons of ashes, or from two to three cars only. The ashes would be withdrawn but once in 24 hr., just before starting up in the morning. When 5 to 10 tons of ashes per day must be handled, any labor-saving system suitable for boilers may be advantageously installed.

Two and one half gallons of water per pound of coal gasified is required for cooling the gas and 4 gal. per brake horsepower-hour for jacket cooling in the engines. One pound of water is required per horsepower-hour for saturating the air used in the producer; this is taken from the engine-cooling system. After passing from the cylinder jackets, the water passes through a heater placed in the engine exhaust line and thence to the saturator.

The total water required for 1 b.-hp. per hr. at 1½ lb. of coal is therefore 7¾ gal. This water can be used over and over again by providing cooling ponds, and the amount needed to make up the loss owing to evaporation would not exceed 3 per cent. of the whole. The water used does not require treatment, and a quality practically out of the question for boilers would be satisfactory.

While the gas-cooling water will gradually accumulate considerable quantities of tar; this does not affect its efficiency nor prohibit it from being used repeatedly if a cooling system is furnished, this system being separate from the one used for the jacket water. The cooling pond required is by no means as large for a given capacity as where exhaust steam from a turbine is to be condensed.

Byproduct Recovery May Be Profitable

Where the fuel consumption reaches a ton of coal per hour, or more, a recovery plant becomes profitable. From 10 to 12 gal. of tar per ton of coal used is recoverable, as well as from 70 to 80 lb. of ammonium sulphate. The latter sells the world over for between $65 and $70 per ton. It is employed as a fertilizer and is especially valuable for the cultivation of beets. No skilled attendant is required for the recovery plant, the receipts from which should go far toward counterbalancing the operating costs of the plant as a whole.

In estimating the amount of sulphuric acid used in the recovery of ammonium sulphate, 1.1 tons of acid per ton of sulphate will be required. The cost of this acid delivered at the plant may be ascertained at the nearest distributing center and will run from $10 to $15 per ton.

Not only is the width of both the producer and the gas-engine room less than that of the boiler and steam-engine room, but the height of the producer room is also materially less than that of the boiler room. The cubical contents of a building to house a steam plant will be about 50 per cent. larger than in the case of a gas plant.

To sum up: At no higher cost the gas plant may be installed in a smaller building; the same output will be realized with less coal to furnish and handle and less ashes to remove. Water may be used that is unfit for steam raising, and where a pond is installed, but a small amount of makeup will suffice to replace the losses due to evaporation. No stack is required, no special foundations, and there is no smoke. The reliability, safety and maintenance are favorable to gas as compared with steam. It would therefore seem that if the loads can be kept anywhere near uniform the gas plant appears an attractive proposition.

Extracts from a Superintendent's Diary

For some time we have felt pretty sure that a labor agent has been enticing our men away, but not until today have we been able to get any positive evidence. Early this morning John Towne, our camp deputy, came by the office and remarked that unless all signs failed he would have a labor agent in the toils before night.

Sure enough, about 2 o'clock he came in, leading a crestfallen-looking individual manacled to him.

John Towne's reputation is so well established in our community that he is never obliged to use force in making an arrest. To offer resistance to him is equivalent to courting a terrible beating, and people who are familiar with his habits are not willing to take chances. The man under arrest was evidently not acquainted with John's peculiarities, as one of his eyes was swollen nearly shut and blood was still flowing from a wound on his right cheek.

It is about impossible to convict a man for the crime of enticing away labor, but it is easy enough to arrest a suspect on some charge and thus get him out of the way temporarily. If the matter is handled cleverly, he will probably have no desire to return. That is the plan our deputy follows whenever he encounters labor agents.

John brought his prisoner into the office and sat him down in a corner in the rear to await the next train for our county seat. While waiting for the time to pass, he procured water and a towel and tried to make the man's face more presentable.

People passing through the office invariably stopped to stare at the stranger, but he seemed to pay no attention to them, nor for that matter to anything that was going on around him. His every action seemed to say: "I am in the hands of the enemy, and no one realizes it more than I do. But I'll be game to the last."

However, he didn't remain game to the last, neither did our deputy.

About an hour before train time my 3-year-old son came over to take a look at his "Daddy," as was his wont on occasions, and he immediately discovered the prisoner at the other end of the office.

He had to get close to him, but he looked him over from head to foot before he opened his mouth; then he started out with questions that demanded answers.

At first the stranger paid no attention to him, but that could not last long. When my boy inquired about his boy, he lost control of himself. "Little boy," he said, "I haven't seen my kids in months, and the good Lord alone knows when I will see them again. I can't hear from their mother because I can't let her know where I am, except when I am in jail, and then I don't want to let her know my whereabouts."

Somehow up to that time it had never occurred to any of the audience that this man was just a human being, but his remarks seemed to change everyone's line of thought.

John Towne was the first to put his thoughts into words. "Say, man," he said, "why in the name of Sam Hill didn't you tell us that you were trying to make a living for a wife and kids?"

As I was leaving the office tonight I noticed John and the stranger walking down the street together, arm in arm, and they were going in the direction of John's home.

They were no longer bound together by manacles, but were bound together nevertheless

French Coal Output in 1914

French coal production in 1914, says *Commerce Reports*, amounted to 29,786,505 metric tons, compared with 40,843,618 tons in 1913. The coal output for the first half of 1914 amounted to more than half of the total production for the year 1913. The detailed figures for the coal-mining regions of France are as follows for 1913 and 1914:

Coal Basins	1913, Tons	1914, Tons
Nord and Pas-de-Calais	27,389,307	17,800,308
Loire and Haute-Loire	3,966,618	3,487,644
Gard and Herault	2,332,091	2,045,378
Tarn and Aveyron	1,974,804	1,810,466
Isere	362,662	317,351
Saone-et-Loire	2,210,091	2,048,200
Bouches-du-Rhone	694,054	619,313
All other	1,913,991	1,657,845
Total	40,843,618	29,786,505

In 1914 France imported from Great Britain 10,759,058 tons of coal, 18,883 tons of coke and 116,549 tons of manufactured fuel (*agglomérés*).

Loyalty via Appreciation

Yes, I work for a man, or rather a corporation, an institution. And I work, as a cog in a great machine—to be sure a small cog, a cog that can easily be renewed by another; but nevertheless while I'm there I help to keep the machine going. Of course the corporation pays me wages that supply my bread and butter—lubrication so to speak, to keep me working smoothly as I do my share to grind out the golden dollars to swell its coffers.

And I do not vilify, I do not condemn, and I do not eternally disparage. I am part of the order of things as they are. But one word I would say:

You man, you institution, who would have the loyalty of your employees, why don't you speak well of them? A pat on the back, a little word of encouragement, a look of appreciation will bind your men to you with threads of loyalty far stronger than chains of tempered steel—a bondage that will not be broken by the lure of higher wages or shorter hours.

An ounce of appreciation is worth a ton—aye, a hundred tons—of browbeating an employee.—Baltimore & Ohio R.R. Co. Employee Magazine.

Accident Prevention During Construction Work*

Probably no other class of work is so productive of accidents as the construction of industrial plants. This is due, primarily, to the fact that the conditions under which the work is done are constantly changing, and that it is generally impracticable to make the working places as safe as they would be made under more stable conditions. Another matter that has a great effect upon the number of accidents is the fact that most construction work is a "rush" job. Foremen and men get out to break records and are keyed up to work at the highest rate of speed, so that the taking of a chance that might cause an accident becomes a matter of comparatively slight importance to them.

Improperly built scaffolding is one of the most important causes of such accidents. Scaffolds are frequently built of any sort of lumber that is quickly available for the purpose, whereas only first-class material that is free from knots should be used.

The proper design of such erections is just as important as that of permanent structures, but in general anything from a single board up that will meet the need of the immediate moment is considered sufficient. Accidents are on record that were caused by a number of ironworkers, who had with them heavy tools and equipment, attempting to use a single-plank staging that had been built for the use of one man who had no heavy tools with him. Scaffolds that are raised 10 ft. or more above the ground should be provided with toe boards to prevent accidents caused by falling tools, and when light swinging scaffolds, such as used by painters, are employed, all tools and materials should be removed from the scaffold when it is not in use.

Keep All the Working Floors Clean

Working floors should be kept as clean as possible, and all permanent openings should be closed in with planking fixed in place, as workmen who may happen to need a plank for any purpose are not particular where they get it and are likely to take any plank that may have been used to cover such an opening if it is not secured in place. These floors should also be made as tight as possible in order to prevent tools and material falling through onto men below. In many cases planks are left so that a man stepping on one end may tip the plank up, and the falls that have been caused by these "traps" are almost innumerable. Those responsible should be disciplined.

Where hoists are used for raising material, the landings should be properly guarded. We have on record an accident that was caused by a man walking under the cage as it was being lowered, no barrier having been provided to prevent him doing so. It is best to close in the sides of the cage or shaft with a solid sheathing, as tools may project and be caught in the framing.

Construction men frequently find electrical wiring that interferes with their work and sometimes handle and move it without proper authority or knowledge of what they are doing. In one case an ironworker held an iron bar against a high-tension wire to find out whether or not it was "live." Fortunately for him, it was not; otherwise he would never have known the difference.

Ironworkers engaged in the erection of steel framing have a particularly hazardous class of work to perform, but in a desire to "show off" some men take chances that are entirely unnecessary. In connection with this work it is also important that the rope slings and tackle that are used should be of the best quality and in good condition. Pieces of rope and cable that have been badly strained and are unsafe for further use are laid aside for the moment until they can be destroyed. Then some man who needs a rope for some purpose comes along and takes such a piece because it happens to be the first thing he sees. He has no knowledge of the condition it is in, and the result is an accident.

When material is being raised and lowered, care should always be taken to keep men away from underneath. A cylindrical tank that was being lowered slipped from the tackle and fell on a man who was working below and caused a serious injury. Many accidents would be prevented if the work were done so that one gang would not have to work below another, and such arrangements should be made whenever possible.

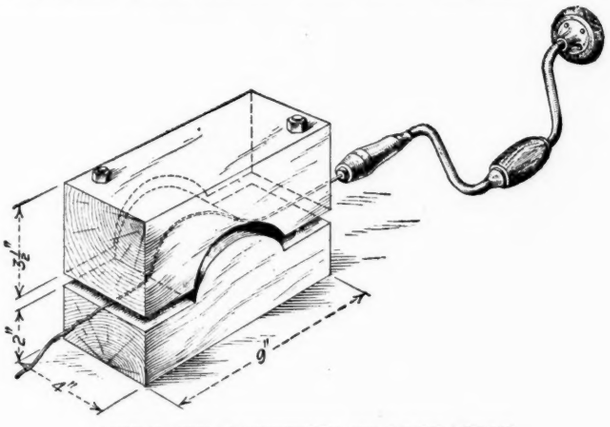
*From "The Anode," published by the Anaconda Copper Mining Co., Butte, Mont.

Handy Wire Straightener

By W. C. Eyl*

One is sometimes confronted with the apparently hopeless task of straightening an old, crooked, kinked wire. To many this is no easy job, but to those who become familiar with the straightener here described the problem will be a comparatively simple one.

To make this straightener first procure two blocks of hard wood, each about 3½x4x9 in. Cut the two ends of one piece down from 3½ in. to 2 in. in thickness for a distance of 2½ in. from either end. This will leave a rectangular projection in the center of the piece. Round



WIRE STRAIGHTENER IN OPERATION

the two ends of this projection off as shown in the accompanying illustration. Now from the other block and on a 4x9-in. face cut out a concave depression to fit over the curved surface of the other block. Now, placing the two blocks together, bore two holes, one in either end and in opposite corners, as shown in the diagram.

By means of two bolts clamp the two blocks onto the wire to be straightened, near one end. Fastening a brace or something similar to the short end, turn the wire, drawing it through the block at the same time. The result will be a straight wire. This device will straighten a wire of any diameter.

*University of Kentucky, Lexington, Ky.

Insuring the Coal Supply

By Henry J. Edsall*

SYNOPSIS—The storage of coal is insurance against either excessive fuel prices or a shutdown. Certain precautions must be observed in stocking bituminous coal, and the means to be employed will vary widely with circumstances, each installation being a separate problem. Many varieties of stocking and reclaiming apparatus are here described.

While it has become almost universal practice among business men to carry insurance against fire, accidents to employees and other possible happenings beyond their definite control, the carrying of an ample coal supply as an insurance against delays or a possible closing down of the plant is apt to be neglected by the coal consumer. The advisability of this kind of insurance is not hammered at him by the insurance man as are the other kinds, and he is apt to have a feeling that he can always get coal somehow, even though there is a shortage.

Every once in a while, however, there is a strike of the coal miners, congested conditions on the railroads, an unusually severe snowstorm, an especially heavy demand for coal, along with a business boom and a car shortage, or something else happens to disturb the equilibrium between the available coal supply and the demand. At such times the prices soar, and the man with a good-sized coal pile pats himself on the back for his foresight, while the one who neglected this precaution is bidding against other consumers, in the same predicament, for enough coal to keep his plant running and to avoid an interruption to business at just the time when business is booming and any delay would be disastrous.

The consumer with ample storage facilities is also in a position to take advantage of special prices which may be offered him at certain seasons of the year or of a special offer of some dealer because of a combination of circumstances affecting him. Better coal can also be obtained at certain times, and the main supply can be laid in under favorable weather conditions instead of having to handle coal all through the winter, with its snow and sleet storms and zero weather.

Where small anthracite steam coal is used, the storage problem is comparatively simple, since the small size makes it easy to handle by machinery, and it can be piled to any depth without danger of spontaneous combustion. Since, however, the majority of the coal used for steam purposes is bituminous, it is this kind as a rule for which storage facilities have to be provided.

Bureau of Mines' Investigations

The United States Bureau of Mines has made some investigations of the deterioration and spontaneous heating of coal in storage and expects to carry on further experiments and publish further data later on. Technical paper No. 16, published in 1912, gives points of information obtained from individuals who have had experience in storing coal under various conditions. It also gives results of tests made by storing different kinds of coal, both exposed to the weather and submerged under fresh and salt water in different localities. The following quotations are from this paper:

The results show in the case of the New River coal a loss of less than 1 per cent. of calorific value in one year by weathering in the open. In two years the greatest loss was at Key West, 1.85 per cent. There was practically no loss at all in the submerged samples in one year, fresh or salt water serving equally well to "preserve the virtues" of the coal. There was almost no slacking of lumps in the run-of-mine samples. In all tests the crushed coal deteriorated more rapidly than the run-of-mine.

The Pocahontas run-of-mine coal in a 120-ton pile on the Isthmus of Panama lost during one year's outdoor weathering less than 0.4 per cent. of its heating value and showed little slacking of lumps.

Gas coal during one year's outdoor exposure suffered practically no loss of calorific value, measurable by the calorimetric method used, not even in the coal forming the top 6-in. layer in the bins.

Submerged storage is an absolute preventive of spontaneous combustion, and on that account alone it may be justified when the coal is particularly dangerous to store and when large quantities are to be stored; but unless the storage period is to be longer than one year, there seems to be no ground for storing any coal under water merely for the sake of the saving in calorific value to be obtained by the avoidance of weathering.

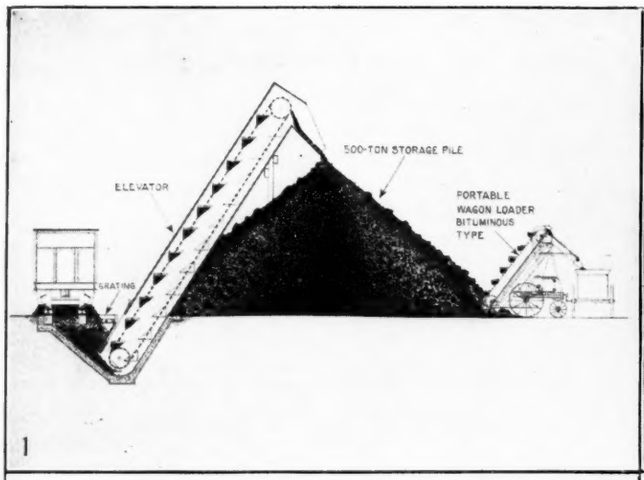
Losses of value from spontaneous heating are a much more serious matter than the deterioration of coal at ordinary temperatures. Oxidation proceeds more rapidly as the temperature rises. The oxidation, beginning at ordinary temperatures, attacking the surfaces of particles and developing heat is probably in some degree an absorption of oxygen by the unsaturated chemical compounds in the coal substance. In a small pile of coal this slowly developed heat can be readily dissipated by convection and radiation, and very little rise in temperature results. If the dissipation of the heat is restricted, however, as in a large pile densely packed, the temperature within the pile rises continuously. The rate of oxidation of the coal platted against the temperature makes a curve that rises with great rapidity. When the storage conditions are such as to allow warming of the coal to a temperature of about 100 deg. C., the rate of oxidation becomes so great that the heat developed in a given time ordinarily exceeds the heat dissipated, and the temperature rises until, if the air supply is adequate, the coal takes fire. Evidently, therefore, it is important to guard against even moderate heating of the coal, either spontaneous or from an external source. Increased loss of volatile matter and of heating value occurs with a moderate rise of temperature, even though the ignition point is not reached.

Spontaneous combustion is brought about by slow oxidation in an air supply sufficient to support oxidation, but insufficient to carry away all the heat formed. The area of surface exposed to oxidation by a given mass of any one coal determines largely the amount of oxidation that takes place in the mass; it depends on the size of the particles and increases rapidly as the fineness approaches that of dust. Dust is therefore dangerous, particularly if it is mixed with lump coal of such a size that the interstices permit the flow of a moderate amount of air to the interior. Coal differs widely in friability; that is, in the proportion of dust that is produced under like conditions. In comparative tests samples of Pocahontas, New River and Cambria County (Pennsylvania) coals produced nearly twice as much dust (coal through a ⅛-in. screen) as coal mined from the Pittsburgh bed in Allegheny County, Pennsylvania. This variation in friability is a factor in affecting the liability to spontaneous heating.

Ideal conditions for such heating are offered by a mixture of lump and fine coal, such as run-of-mine with a large percentage of dust, piled so that a small supply of air is admitted to the interior of the pile.

High volatile matter does not of itself increase the liability of coal to spontaneous heating. A letter of inquiry sent by the bureau to more than 2,000 large coal consumers in the United States brought 1,200 replies. Of the replies 260 reported instances of spontaneous combustion, and 220 of the 260 gave the name of the coal. The 220 instances were distributed as follows: 95 were in semibituminous low-volatile coals of the Appalachian region, 70 in higher-volatile coals

*Philadelphia, Penn.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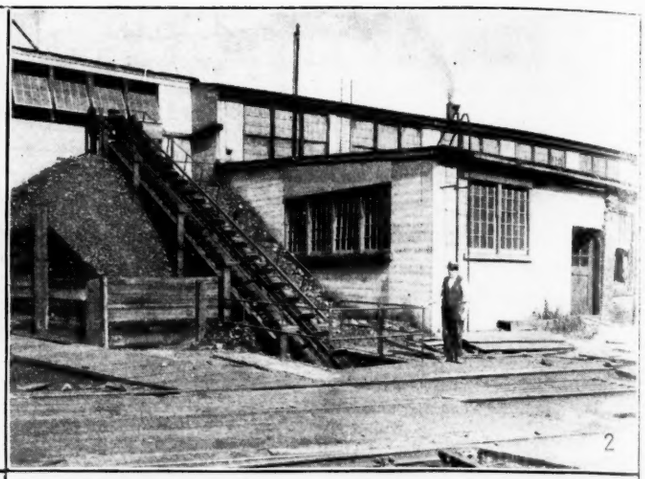
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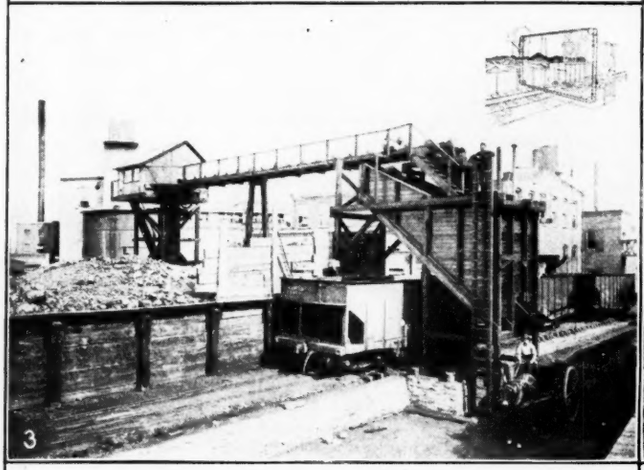
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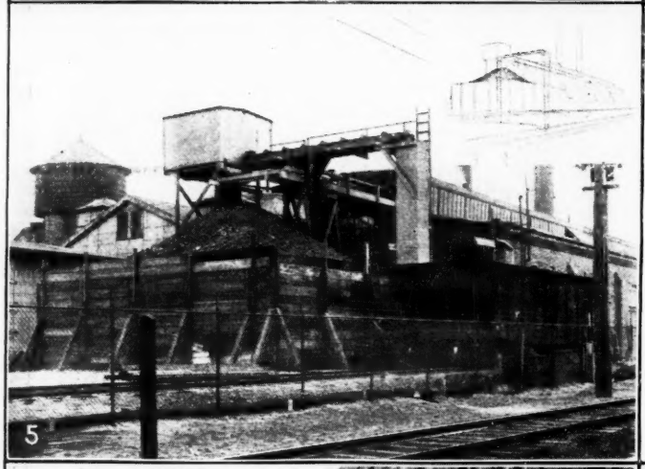
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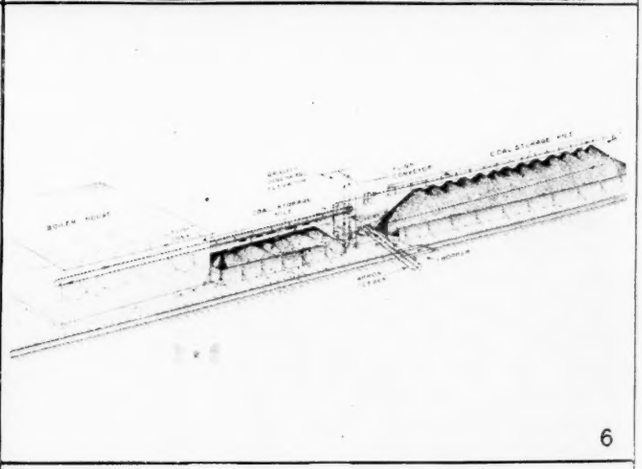
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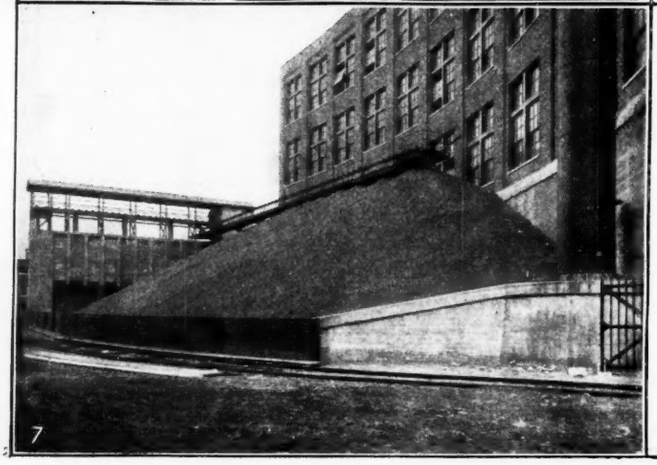
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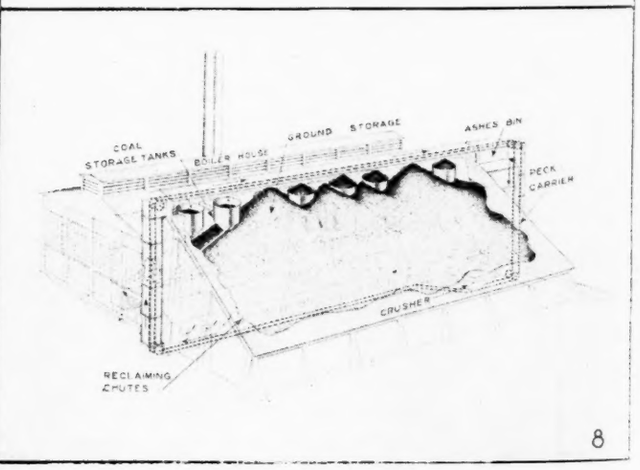
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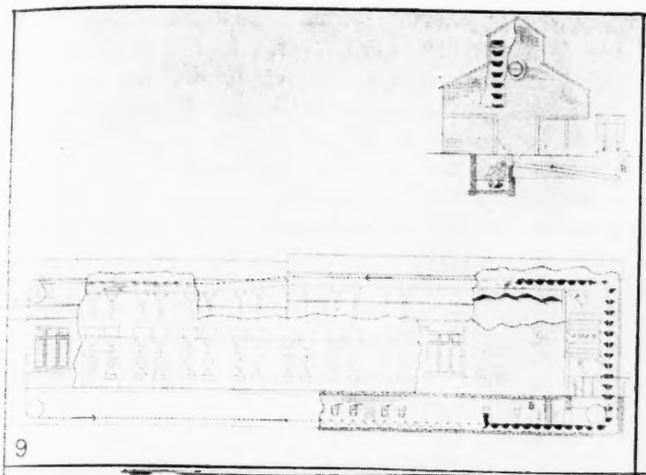
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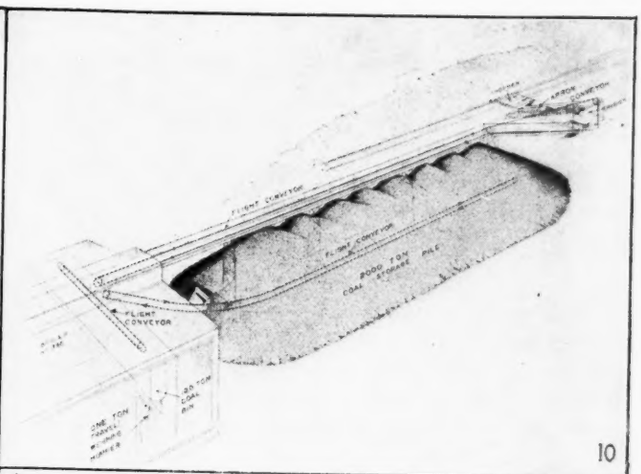

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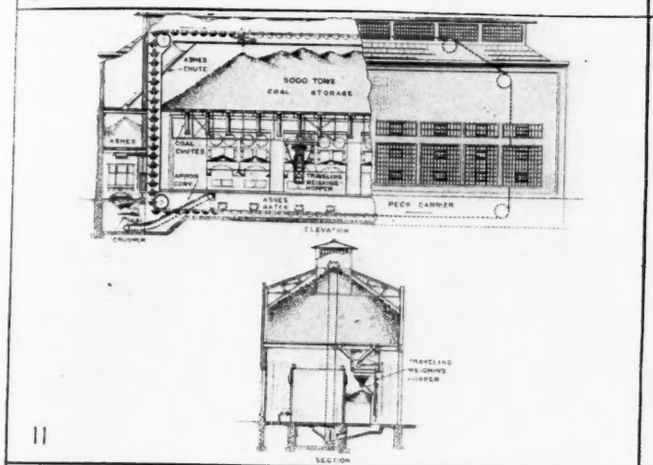

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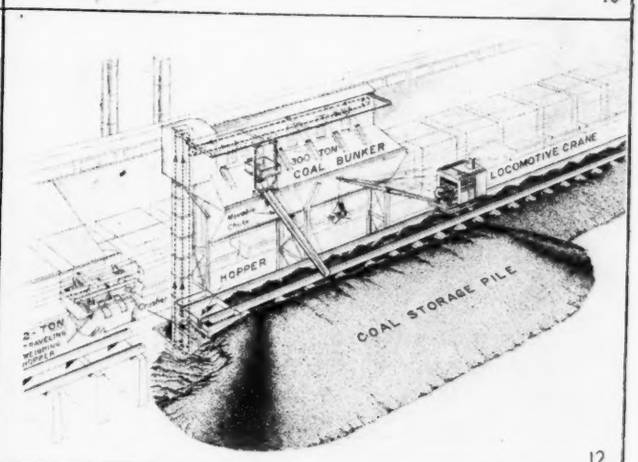

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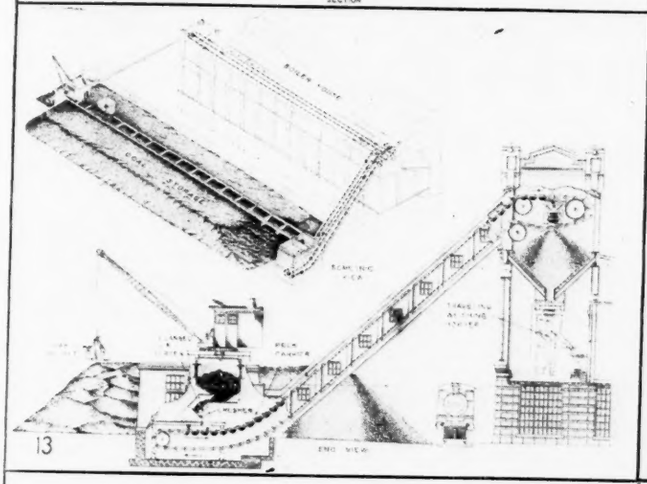

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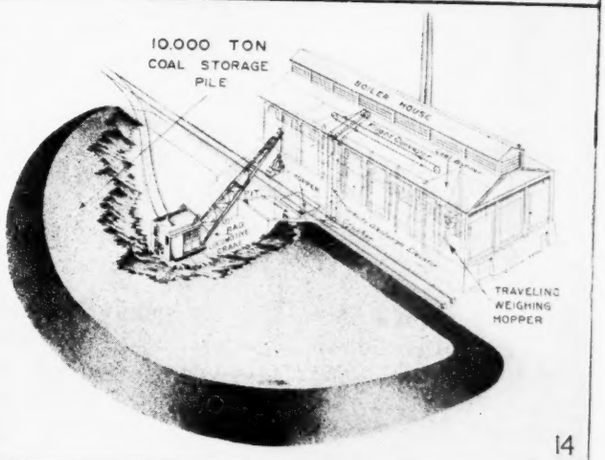

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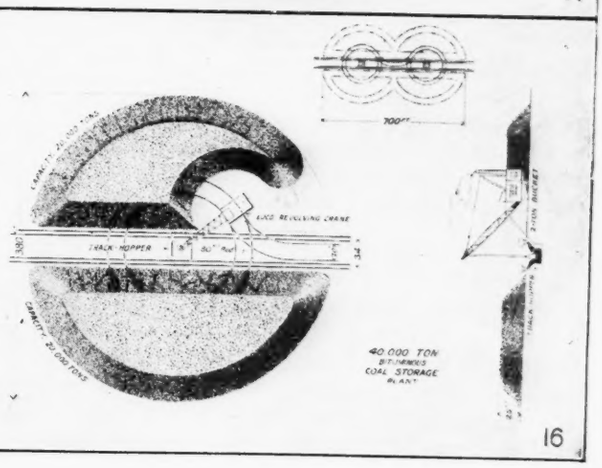

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of the same region and 55 in western and middle-western coals.

Freshly mined coal and the fresh surfaces exposed by crushing lumps exhibit a remarkable avidity for oxygen, but after a time the surfaces become coated with oxidized material, "seasoned" as it were, so that the action of the air becomes much less vigorous. In practice, coal that has been stored for six weeks or two months and has even become already somewhat heated, if rehandled and thoroughly cooled by the air, seldom heats spontaneously again.

Overhead Storage Used with Mechanical Stokers

Where mechanical stokers are used, it is almost universal practice to provide an overhead storage bin for at least part of the coal supply, this bin being located either right in the boiler room or at a convenient point close by. This coal is either spouted direct to the stoker magazines or drawn from the bin into a traveling larry or weighing hopper running on an overhead track above the stokers, the coal being delivered from the larry to the magazines.

Where the firing is done by hand, the coal is shoveled from the floor or from a charging car, so that the overhead bin does not show such a decided advantage over a ground-storage bin. The overhead bin is often used, however, for the sake of neatness and on account of the possibility of arranging it so that the greater amount of the coal can be spouted by gravity to convenient points within easy reach of the fireman without having to keep a lot of coal on the boiler-room floor or constantly bringing it in from the outside.

Without the overhead bin it is customary either to pile the coal against the outside of the boiler-room wall, in front of the boilers, and leave openings in the wall so that it will flow through onto the floor within easy reach of the fireman, or to pile it at as convenient a point as possible for transfer to the boiler room.

On account of the expense of construction the amount of overhead storage is usually kept down to what is considered a minimum for satisfactory operation, and some cheaper type of storage is arranged for the reserve supply, with a means of transfer from the reserve storage to the active storage.

The justifiable amount of investment for reserve storage and transfer facilities depends on the size of the storage that is considered advisable, on the amount of coal which will be delivered to the storage and transferred from it in a certain time and on local conditions. In some cases coal is as a rule received regularly, and the reserve supply is simply an insurance against unusual contingencies, to be called on only at infrequent intervals. In such cases it may pay better to use hand labor partly or entirely for the storage and transference rather than to invest much money to eliminate this hand labor when it does not figure as a large yearly expense. In other cases the coal supply may be so irregular that it is necessary to call on the reserve storage at frequent intervals, and the amount of hand labor which it is possible to eliminate justifies quite a large investment.

Run-of-Mine Coal Is Usually Crushed

If the coal is received as run-of-mine and is to be used in mechanical stokers, it is usually passed through a crusher before it is delivered to the stokers. At small plants it is sometimes passed through a grating over a feeding hopper or the large lumps are broken up in some other way, instead of the expense being incurred of installing a crusher with its driving arrangement. Where the coal is to be fired by hand the crushing is not considered necessary as a rule; but if it is to be handled by machinery, it must be crushed or the machinery must be made capable of handling the largest lumps.

When a crusher is used it can be placed at the receiving point, so that the coal is passed through it as soon as it is unloaded and before storing. On the other hand, if a reserve storage is employed, the coal may be stocked as run-of-mine and passed through a crusher just before it goes into the active storage for the boiler room.

This means collecting from the reserve storage and bringing all coal to the fixed point where the crusher is located, unless this machine is made to move along on wheels, as is sometimes done. Where the coal is handled entirely by conveyors, it simplifies the problem to crush it first, so that it is easier to handle, though this necessitates the storing of crushed coal in the reserve supply as well as in the active storage.

The Reserve Storage May Be Run-of-Mine

Where a grab-bucket arrangement is used for the reserve supply, it is usually just as easy and sometimes easier to make this a run-of-mine storage and crush the coal just before it goes into the supply for the boiler room. Since the coal mines are fast becoming equipped with screening and picking arrangements for sizing and preparing the coal, it is now entirely feasible to buy coal of the size required for use, though the sized coal costs a little more than the run-of-mine.

In considering the different types of reserve-storage plants, the simplest case is undoubtedly that where a moderate amount is unloaded from railroad cars and piled on the adjacent ground without any provision for reclaiming mechanically. The most economical machine for this work is a chain-and-bucket elevator or an inclined scraper conveyor, technically known as a flight conveyor. A pit is built under the railroad track at the unloading point so that the coal can be discharged from hopper-bottomed cars into the pit and fed through a gate to the elevator or conveyor. With the elevator the buckets pick the coal up, elevate it and discharge it at the head to a chute to the pile. With the inclined conveyor the flights scrape the coal up in a steel trough and discharge it in a similar manner at the head.

The coal can be handled as run-of-mine or a grating can be placed over the track hopper and the larger lumps broken on it, thereby making it possible to use a somewhat smaller and cheaper equipment. For a pile of 500 or 600 tons, the machinery, including a motor for driving, can be purchased for about $600; and in addition to this there will be the cost of the pit and machinery supports, also the cost of installing the equipment. Machines of this kind usually handle coal at the rate of about 30 or 40 tons per hr., providing the coal can be unloaded from the cars at this rate. This depends on the type of railroad car, the percentage of lumps in the coal and the number of men used to unload the cars.

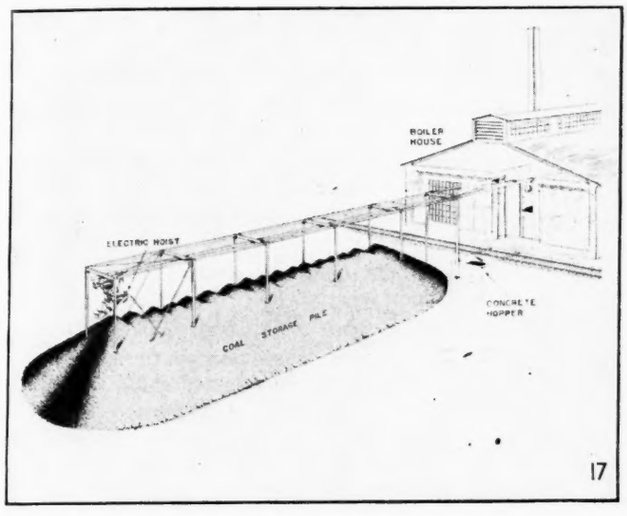
Where a cart is available for hauling the coal to the boiler room or where it can be transferred by small industrial cars, a portable wagon loader is an excellent way to pick it up from the ground. A standard machine of this type will handle anthracite or run-of-mine bituminous coal at the rate of a ton a minute. They are built both hand- and power-propelled, the hand-propelled

machines costing about $550 and the power-propelled ones $850, complete with electric motor or gasoline engine for operation.

Fig. 1 shows a bucket elevator delivering to a ground-storage pile and a portable wagon loader handling the coal from this storage to carts. Fig. 2 shows an inclined flight conveyor handling coal from the railroad cars to a ground-storage pile, the pile in this case being adjacent to the boiler room so that part of the coal flows through openings in the boiler-room wall to the floor directly in front of the boilers.

A Conveyor May Both Store and Reclaim Coal

By going a step further and adding a reclaiming feature, a conveyor can be made to deliver the coal to the storage, also take it from the storage and deliver it at a desired point. For this work a gravity-discharge type of machine is often used because it will both elevate the coal and convey it along horizontally or at an incline, and by bringing the buckets back in a tunnel underneath the pile, the same machine can be used as a reclaiming conveyor. These machines have V-shaped buckets carried between two chains and properly attached to them. When elevating, the coal is carried up in the buckets. When it is being conveyed, the buckets act like the flights of a flight conveyor and push it along in a steel trough, through which it can be discharged at the desired points by means of gates.



THE CLAMSHELL BUCKET AND MONORAIL STORAGE

Fig. 3 shows an arrangement like this for handling coal from railroad cars and delivering either to a small overhead bin or to a ground-storage pile, also taking from the pile and delivering to the bin. The conveyor encircles the bin and pile, the lower run being located in a tunnel underneath the pile. When the stored coal is wanted, it is fed through gates to the lower run of the machine and taken up to the pocket. In this case there are three boiler rooms in the plant, and the coal is loaded into carts and delivered to the boiler rooms in this way.

A Combination Is Often Employed

Frequently in piling coal a combination of bucket elevator and flight conveyor is used, the elevator taking the coal up to the proper height and the flight conveyor distributing it along in a pile of any desired length that is not excessive for a conveyor. A combination of this kind is shown in Fig. 4. The maximum depth of the coal is about 18 ft., and the length of the conveyor is 200 ft.

Without resorting to hand-trimming of the coal—that is, simply allowing it to take its natural slope as it is discharged from the conveyor—it is possible to store about 3,000 tons of anthracite coal or 2,000 tons of bituminous, the difference being due to the difference in the natural slope of the two kinds of coal. This sort of an arrangement is quite similar to a railroad-trestle storage, but is much cheaper in first cost as well as in maintenance and depreciation, unless the railroad trestle is built of permanent and therefore expensive construction.

Where the reserve storage is at some little distance from the boiler room, a flight conveyor in combination with a gravity discharge machine with the reclaiming feature is sometimes used. The gravity-discharge elevator-conveyor takes the coal up and delivers it to the flight conveyor for immediate transfer to the boiler room or delivers it to the storage pile. The stored coal can be taken from storage, the same as in Fig. 3, but in this case it is delivered to the flight conveyor, which serves instead of carts to transfer the coal to the boiler room.

This kind of an arrangement is shown in Fig. 5. In this plant the amount of coal consumed per day is about 20 tons, and the amount that can be stored is about 600 tons, or 30 days' supply. Fig. 6 shows a somewhat similar arrangement. In this case the elevator is located about 65 ft. from the end of the boiler room, and the space between it and the building is used for storage, being served by the flight conveyor to the boiler room.

In the opposite direction there is a flight conveyor encircling the pile and having a horizontal length of about 150 ft. When coal is being delivered to this pile, it is elevated by the elevator and carried out on the upper run of this flight conveyor. When it is being taken from the pile, it is fed to the lower run of the flight conveyor in a tunnel underneath the pile, delivered to the elevator, then taken into the boiler room by the other flight conveyor. As the firing is done by hand the coal is simply deposited on the boiler-room floor.

A Pit May Be Used for Storage

The arrangement shown in Fig. 7 is for small anthracite coal. The storage space was excavated so as to form a pit, the coal being stored in the pit and also piled up above the regular ground level. Over 11,000 tons of coal can be stored at this plant, and all except a little that is used in some boilers in an adjacent building is carted to the main boiler room of the publishing plant, a mile or so away. The machinery includes a gravity-discharge elevator-conveyor, a stocking-out flight conveyor and two reclaiming flight conveyors in tunnels under the pile. The gravity-discharge machine elevates the coal and delivers it to the wagon-loading pocket or to the pile, and also transfers coal from the pile to the pocket. The stocking-out conveyor serves to pile the coal on out in the storage area away from the pocket, and the reclaiming conveyors take it from points out of reach of the gravity-discharge machine and transfer it to this machine. The rate of handling is about 40 tons per hr.

For low maintenance cost and reliability the pivoted-bucket carrier type of conveyor excels all others for

handling coal, ashes and similar materials. Some makes of these machines have been carefully perfected, so that they represent a high degree of development in the conveying art. With this type of machine the material is carried along in the buckets, which do both the elevating and distributing. The material is discharged by tilting the buckets with a tripping arrangement at the desired points, and the weight of chains, buckets and coal is supported on the horizontal runs by large well-oiled rollers traveling on T-rails. These rollers are confined between T-rails on the vertical runs, so as to guide the chains and buckets.

Two ways of using these machines in connection with reserve storage are illustrated in Figs. 8 and 9. The former has overhead-storage bins directly over the reserve storage, with the carrier encircling both the overhead and ground storage, also encircling an ash pocket. When the overhead storage is depleted, the coal in the reserve storage can be fed to the lower run of the machine and transferred to the overhead bins.

With a reliable machine of this kind to transfer the coal, the overhead-storage can be made quite small and the first cost thereby reduced. Even though the replenishment of the overhead supply is dependent on the frequent operation of the carrier, there is little danger of lack of coal in the overhead bins owing to trouble with the machinery, as breakdowns with a first-class carrier are almost unknown, and repairs which may be necessary at long intervals can be made with little or no delay in the operation.

The other design is quite similar to this, except that the main or reserve supply in this case is placed in a bin at one end, instead of being underneath the overhead bins. This particular carrier has a horizontal run of about 275 ft. and a vertical lift of about 42 ft., or a total length of about 630 ft. Only a little over 8 hp. is required to operate it.

Conveyors Are Cheaper Than Trestles

In many cases, and probably in most cases, where railroad trestles are built for storing coal, a better and less-expensive arrangement could be obtained by having the railroad track at ground level and using conveyors to elevate and distribute the coal; and where an overhead supply is desired, the conveyors can usually be arranged to transfer the reserve coal to the overhead bins. A case where the design was changed from a railroad trestle to a conveyor arrangement is shown in Fig. 10.

The railroad track comes in at a level considerably above the boiler-room floor and the coal-storage area, and it was the intention to continue the railroad track out on a trestle so that the coal could be dropped underneath for the reserve storage and delivered to a conveyor arrangement which would deposit it in a bin in the boiler room for the supply to mechanical stokers.

It was found, however, on further investigation, that the conveyor arrangement, illustrated in Fig. 10, would be cheaper in first cost and would handle the coal more automatically so that there would be less labor cost, and the amount of storage was also largely increased over that which could be conveniently obtained with the trestle. The distributing conveyor takes the coal out along the light trestle and delivers it to the ground storage or takes it directly into the boiler room and delivers to a conveyor over the overhead bin. A feeder is provided at the track hopper to feed the coal regularly to the distributing conveyor, and provision is also made for a possible future crusher installation, though for the present it is the intention to purchase coal already sized.

Underneath the coal pile is a concrete tunnel with a reclaiming conveyor to which the reserve coal can be fed and taken up to the conveyor over the boiler-room bin. The delivery from the overhead bin to each of the three mechanical stokers includes an automatic-weighing hopper which will automatically weigh all the coal which is delivered to each boiler. The capacity of the overhead bin in the boiler room is about 120 tons, and about 2,000 tons can be stored in the outside reserve storage. The daily coal consumption of the plant is about 60 or 70 tons.

In Fig. 11 is illustrated what might be called a combination active and reserve storage all in one, since the overhead bin is made very large instead of putting part of the coal in an outside reserve pile. This of course is expensive construction, but in this case appearance was an important consideration, and an outside coal pile would have been considered unsightly.

The overhead bin is really a large room on the second floor, extending the full width of the boiler room. It will hold in the neighborhood of 5,000 tons of coal. The amount consumed per day is about 60 tons, so that the storage should last nearly 80 days. While this coal is all stored overhead, on account of the large area of the bin there would be a considerable percentage of it which would not flow out of the chutes without being trimmed over to them by hand.

There is also the danger of spontaneous combustion with such a large and deep pile, and steam pipes have been built into the coal bin so that live steam can be discharged into the coal pile in case of fire, though the effectiveness of this method of providing against fire has yet to be proved.

Both the coal and ashes are handled by a single pivoted bucket carrier, with a feeder and crusher at the track hopper, so that the machinery arrangement is about as simple and ideal as it is possible to make it. The handling of the ashes and feeding them to the conveyor are all done in the basement, so that the dirt and confusion of this operation are avoided on the boiler-room floor. This secures about as neat and shipshape a boiler room as it is possible to get.

Weighing Hoppers Are Often Used

Coming now to the equipment, which includes a self-filling bucket for handling the reserve coal, Figs. 12, 13 and 14 show boiler rooms with overhead bins and traveling weighing hoppers for handling the coal. Fig. 12 has the bin outside the boiler room, with chutes through the wall to a 2-ton weighing hopper. As the coal is unloaded from railroad cars it is passed through a crusher and then taken up to the distributing conveyor over the bin by means of a double-strand bucket elevator.

The distributing conveyor delivers either direct to the overhead bin or to a traveling chute which can be moved along the roof of the bin and which discharges the coal into a pile along the railroad trestle. When the reserve coal in the outside storage is to be reclaimed, this is done by means of a clamshell bucket on a standard-gage locomotive crane, the coal being picked up and delivered to the track hopper for transfer to the overhead bin. Fig. 13 shows a storage on a water-front property, the coal

being unloaded from boats by means of a locomotive crane equipped with a clamshell bucket and then transferred by means of a weighing car or larry, which is pushed by the crane, the car delivering either to the outside storage or to a track hopper for transfer to the bin in the boiler room.

From the track hopper the coal is fed by means of a reciprocating feeder to a crusher, and then goes to a pivoted bucket carrier which runs up an incline and delivers to another pivoted bucket carrier that distributes the coal in the overhead bin. The weighing hopper in the boiler room has a platform near the floor upon which the operator can ride, but which is near enough to the floor so that he can easily get up and down any time he wishes.

Fig. 14 shows an outside reserve storage served by a locomotive crane traveling on a circular track. When the coal is unloaded from the railroad cars, it either goes through a crusher and up into the overhead bin in the boiler room or into a pit alongside the track hopper, from which the clamshell bucket picks it up and delivers it to the outside pile. When it is being reclaimed, it is handled from the pile back to the track hopper and up into the bin. This makes an excellent type of locomotive-crane storage.

Fig. 15 shows the possibility of using a locomotive crane on a track along a wharf and piling the coal directly back of the railroad track as it is unloaded from boats. In this case there is a conveyor to the boiler room at one end of the storage area, and the coal is either taken out of the boats and delivered directly to the receiving hopper for the conveyor, or if it comes from the storage it is picked up from the area near the receiving hopper and delivered to it without moving the crane, or if this area is all cleaned up, as is frequently the case, the crane takes the coal from farther along the wharf and travels with it to the receiving hopper.

This is not such a slow operation as it might seem, as the crane has a traveling speed of from 400 to 500 ft. per min., so that it can go 200 ft. down the wharf and back in a minute or less; and with this as an average length of travel, a rate of 30 tons per hr. could easily be obtained with a 1-ton bucket.

When a large storage capacity for soft coal is desired, say over 5,000 or 10,000 tons, the cheapest way to obtain it is to use a large radius locomotive crane and store the coal in a circular pile, as shown in Fig. 16. This shows a crane with 100-ft. radius traveling on a double circular track with 20 ft. from center to center of the two tracks. With one circular track for the crane and a pit at the center for the buckets to take the coal from, it is possible by this method to store over 70,000 tons of coal. The buckets ordinarily used with a crane of this size will hold 3½ tons, and handling-capacities as high as 240 tons per hr. have been obtained with them.

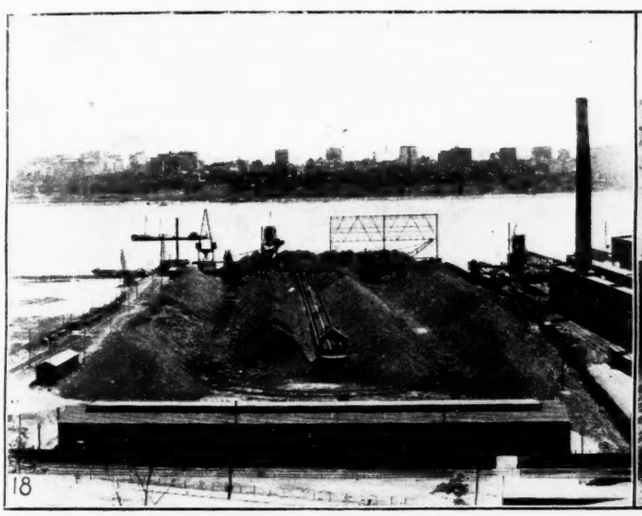
Storage by Clamshell Bucket and Monorail Trolley

Clamshell buckets handled by electric hoists running on overhead monorail tracks have been used more or less for storing coal and taking it into the boiler room. Such a machine is shown in Fig. 17. The operator travels along with the electric hoist in a small cage and controls both the hoisting and the traveling motors. The coal is picked up from a pit to which it is discharged from the railroad cars and taken either directly into the boiler room and delivered into the stoker magazines or piled on the ground underneath the monorail track.

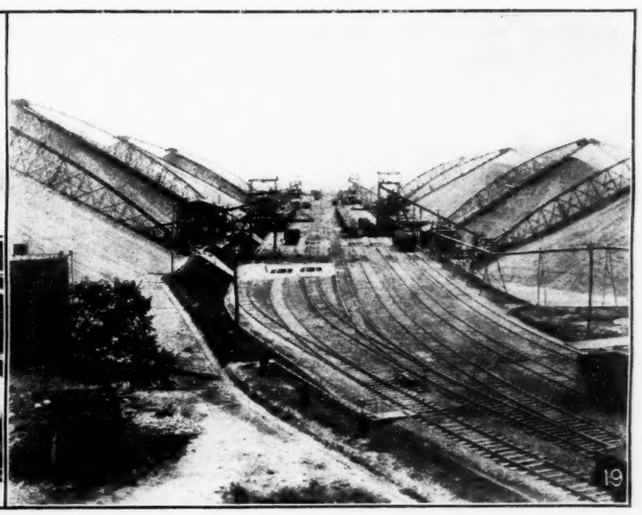
This makes a simple, and usually not very expensive, type of storage and delivery to the boiler room, but it necessitates keeping an operator continuously at work handling the coal; and if there is any trouble with the hoist or the operator is not there all the time it means getting the coal in by hand.

This arrangement also complicates the crushing of the coal if it is to be received as run-of-mine and crushed before it is delivered to the stokers. A crusher can of course be placed under the track hopper, so that the coal will go through it before it goes to the pit and then to the boilers, or to the outside storage, but this necessitates a deep pit unless the local conditions are such that the track is elevated.

The storage plant of the New York Edison Co., at Shadyside, N. J., across from New York City, is shown in Fig. 18. This plant has two 100-ft. radius locomotive cranes and a cable railway for distributing the coal along



THE SHADYSIDE PLANT OF THE NEW YORK EDISON CO. OPPOSITE NEW YORK CITY



PHILADELPHIA & READING COAL AND IRON CO. STORAGE PLANT AT BRIDGEPORT, PENN.

the length of the plant and taking it back. It also has both unloading and loading machinery for transferring the coal from and to boats. The storage capacity of this plant is 225,000 tons.

Dodge System Is Advantageous with Anthracite

For storing sized anthracite coal on a large scale, by far the most successful method is by means of the well-known "Dodge system," wherein the coal is piled in large conical heaps by conveyors running up inclined trusses and the reclaiming is done by pivoted conveyors which are swung around at the ground level on circular tracks and take the coal back and deliver it to the railroad cars. The Philadelphia & Reading Coal and Iron Co.'s plant of this type at Bridgeport, Penn., is shown in Fig. 19.

This plant has a capacity of 480,000 tons of coal in eight piles. The capacity of the stocking-out conveyors is 1,800 tons per day of 10 hr., or a total stocking-out capacity of 14,400 tons per day. There are four reloading conveyors with a capacity of 2,500 tons per day each, or a total capacity of 10,000 tons per day, or 10 hr.

In designing a reserve-storage plant the local conditions and requirements have to be studied carefully, as each installation is a different problem. There are also almost unlimited combinations of different types of machines to obtain the results desired, so that expert knowledge and long experience are necessary in order to select the type of plant which will give the best satisfaction and which will be cheapest in the long run.

Pages from a Miner's Notebook: Prohibition and Coal Mining

I am not a prohibitionist, neither do I patronize the saloon. Therefore, perhaps, I am qualified to set down here impartially an example of the evil (?) which will be wrought by the eventual closing of the saloons by laws enacted at the behest of pestiferous meddlers.

During the day Jim Bates is a miner. His place is close to mine—so close in fact that I often hear the heated words that pass between Jim and the pitboss and frequently catch a glimpse of the troubled face of the latter official after one of his many daily visits to Jim's place.

During the night Jim Bates is chief oracle at the bar of the saloon. There is no argument for the liquor traffic which Jim hasn't at his tongue's tip and which he will not hesitate to advance, under stimulus of a drink or two, in a loud voice for the edification of those who occasionally patronize the place.

There is nought but evil in prohibition, according to Jim. And he can prove it. He can prove it to the satisfaction of the bartender who plies him with drinks "on the house" and after an evening's session has proved it to himself as he staggers home.

Night before last there must have been an extra hard-headed bunch for Jim to convert. He went directly from the mine to the saloon, where he stayed until the place closed. With some three hours' sleep and with the grime of the previous day still visible on all but the high spots, he went to work yesterday morning. I argued with him that he was in no condition to enter the pit. He was shaking with racked nerves, his tongue was thick and his eyes were cloudy, but my arguments were in vain.

I heard the pitboss call him down, not roughly or unkindly, but with a stinging sarcasm that was lost upon the alcohol-soddened brain. Then there were instructions as to a prop Jim should set immediately. The pitboss left, and Jim kept on loading the car. In another minute or two I heard a fall. Three of us lifted the rock from Jim's unconscious body. Four of us carried him home.

Today an unofficial committee solicited funds to buy Mrs. Jim a wash-boiler, tubs and soap and a supply of groceries to last until she can take in a few washings.

Jim, with a wrenched back and broken leg and arm, will have the best of care and the family will not suffer even though there isn't much washing to be had, as a considerable fund was raised.

Many of the men gave five dollars and pledged themselves for more if necessary. The proprietor of the saloon grudgingly gave 50c. It may be that he was engaged at the time in pondering the "evils" that will befall him should nation-wide prohibition become established.

Ballads of a Coal Miner—IX

Peace

Written expressly for Coal Age — By Berton Braley

Six weeks of strike an' now the row is ended,
We're back to work an' gettin' out the coal;
Our leaders say our victory is splendid
An' things is rather better, on the whole—
But say, somehow the whole blame thing seems foolish
With all its loss an' trouble, wrath an' hate;
If only people wouldn't be so mulish
There wouldn't be no strikes—we'd arbitrate.

If men could only learn to KNOW *each other*
An' realize each other's point of view,
Instead of lettin' prejudices smother
Their common-sense the way they seem to do;
If boss an' men would only get together
As human bein's, not as bitter foes,
We might be done with fightin' hell-fer-leather;
We might have peace—we need it, heaven knows!

BUT NO, the owners think we're only cattle; we think they're worse than tyrants of the past;
An' so the row goes—battle after battle, strike after strike—an' will go, to the last.

Steel Mine Timbering

By Samuel Fray, Jr.

The consistent application of steel to mine timbering in the United States dates from 1907. It is conservatively estimated that in the year 1914 steel mine timbers of various kinds were utilized to timber 20 mi. of headings, and this despite the fact that the year 1914 was by no means an active one in the coal-mining industry.

Among the large operators in the bituminous coal fields of western Pennsylvania is W. J. Rainey, with general offices at Uniontown. This company operates seven slope and drift mines and four shaft mines. Its output of bituminous coal is about 3,000,000 tons per year, much of which is utilized in the manufacture of coke.

Within the last three years this company has installed some 2,200 sets of steel mine timbering in approximately 2 mi. of headings. Installations are to be found in several mines of this company, but the views herewith may be considered as representative of practice in this district. They were taken in the Royal Works mine, Fayette County, Pennsylvania.

Fig. 1 shows an underground mine stable. This houses 38 horses and mules. It is not a temporary makeshift, but a structure intended for permanent use and convenience and compares favorably with first-class structures on the surface.

The stable is constructed alongside the main haulage way. The roof is carried on 12-in. I-beams, between which are sprung concrete arches. The ends of the beams rest on concrete side walls. About middle length 4-in. steel H-beam posts are placed under each I-beam roof support. These posts serve as a partial support to the roof beam, and also form the back part of the stalls,

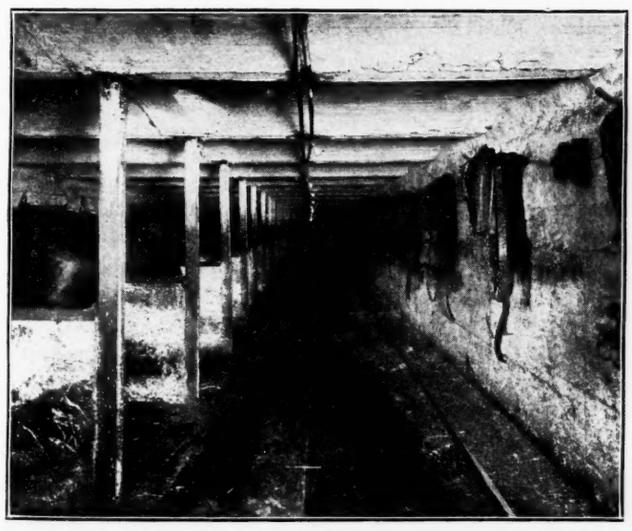


FIG. 1. STEEL TIMBERING IN AN UNDERGROUND STABLE

which are separated by concrete partitions. The broad flanges of the H-beam permit concrete to be molded between them, thus insuring permanent anchorage. The stable shows, both from a sanitary and a mechanical point of view, the progressive character of the management and its endeavors to make underground conditions for both men and animals as favorable as those on the surface.

Fig. 2 shows a portion of the double track main haulage way. This is 18 ft. wide and 8 ft. in height. It is framed with three-piece gangway sets consisting of 12-in. steel I-beam collars and 5-in. H-beam posts, the latter resting on concrete side walls. The collars are separated by wood spacers and lagged overhead by plank. Trolley wires are fastened to the I-beam collars by Ohio Brass Co. trolley-wire hangers, particularly designed for the attachment of trolley wires to steel timbers. The power lines and

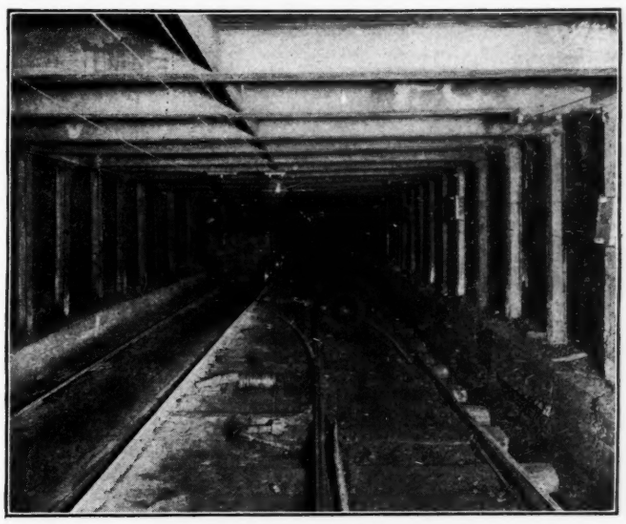


FIG. 2. A PORTION OF THE DOUBLE-TRACK MAIN HAULAGEWAY

light wires, as shown in the view, are attached to collars and posts on wooden insulator blocks secured by hook-bolts.

The appearance of this main haulage way commends itself to mine superintendents desirous of excellence in mine timbering. One is impressed also by the great contrast in the amount of labor connected with the placing of such sets as compared with the handling of the large sticks of wood timber of sufficient strength to serve for the proper support of the loads carried by the steel timbering, and also with the security which results from the omission of a center line of posts which would probably have been necessary if the haulage way had been framed in wood.

The installation at the Royal Works reflects great credit on the management. The expenditure for steel has proven beyond question a satisfactory and economic investment.

BY THE WAY

The man who laughs outside when he is crying inside, who wears a smile on his face when tears fill his heart, has mastered the greatest of all arts—self-control.

Some coal-mine officials have one kind of religion for Sunday and a different brand for Monday. The only kind that's worth while is the kind we can wear every day in the week.

Every man who has attained great heights has been an idealist; for if he were not, his ultimate aim or goal would soon have been reached and the race finished. There must always be a further outlook on the highway leading to success.

The Labor Situation

SYNOPSIS—An uneventful meeting of the Shamokin district of the United Mine Workers of America was held at St. Clair, Penn. The miners declare that the Colver wage rate cuts heavily on the scale adopted for central Pennsylvania. The miners in Ohio are now working more steadily except in the mine of the Sunday Creek Coal Co.

On Oct. 19 the delegates from district No. 9 of the United Mine Workers of America met in the Columbia hose company hall at St. Clair, a small town near Pottsville, Penn. This meeting while large did not arouse much interest because the tridistrict convention had already been held, and consequently none of the matters brought before the district had reference to the threatened strike.

Of course the usual resolutions were passed calling for a pardon for Patrick Quinlan, the labor leader of New Jersey, and another blaming John D. Rockefeller, Jr., for the conditions in Colorado and asking that the report of the Industrial Relations Commission be published in full. But the important resolution was one in which it was proposed to hold meetings biennially instead of annually and to elect the officers of the union for two years. This is intended to save much unnecessary expense. After much discussion the matter was referred to the committee on the constitution. It was eventually decided to make the election of officers biennial, and the president will hereafter draw $167 a month and expenses.

A resolution called for the separating of district 9 from the tridistrict organization, but that motion was declared unconstitutional. The Butler controversy, which has been carried to the courts and made the subject of injunctions, seems to have lost some of its bitterness. A resolution was submitted stating that the district officers had erred in taking up the case against Butler and containing a clause forbidding the district from using any further money in the matter. It was tabled by a large vote. The convention concluded its session on Saturday, Oct. 23.

Miners Raise Salaries and Honor Their Founder

The miners who are demanding an increase of wages of 20 per cent. took a dose of their own medicine and voted the officials of the organization 10 per cent. increase and the two stenographers 20 per cent. For efficient service in preparing for the opening of the convention, during which the force worked overtime, these ladies were granted an allowance of $25. The miners, it will be remembered, are asking in their third demand for time and a half for all overtime and double time on Sunday and holidays. They showed in this vote an excellent disposition to do as they are done by.

A wreath was placed by the delegates to the convention on the grave of John Siney, Sr., the man who is regarded as the founder of the union. He was a resident of St. Clair and his family still lives in the town. His body was interred in St. Boniface cemetery at that place. District President Matthews made an address, followed by Daniel Duffy. A monument was long ago erected to John Siney, this tribute to his memory being unveiled on Nov. 1, 1888.

The convention decided to publish the by-laws of the district in Polish, Slavish, Lithuanian, Greek and Italian, as 87 per cent. of the members are of alien extraction. Though at one time Butler declared that the convention was "packed," meaning not representative, in the end harmony prevailed, and everyone is working to further the progress of the union. The convention next year will be held at Mt. Carmel, Penn.

Colver Scale Said To Be Lower Than Union Rates

The Colver mines are working steadily, but the union leaders continue to make complaint that the wages paid by the Ebensburg Coal Co. need upward revision. In a reply to General Manager E. S. Saxman, Charles O'Neill, the vice-president of the district, states that the district price for pick mining is 72c. per ton and the price at Colver is only 52c.; that cutting by machine and loading should be paid for at the rate of 56c. per ton, whereas at Colver the rate is 47c.

The district price for inside day labor is 33c. to 42c. per hr. At Colver that hourly rate is only 25c. to 30c. However, the rate for loading after machines is 42c. in both Colver and in mines working under the district scale. O'Neill claims that there is no checkweighman on the tipple. He declares that because of the low rate paid and the reopening of union mines nearby, the village of Colver has now 60 idle houses and has lost 400 miners.

The miners in Ohio are for the most part at work. The operators slowly and with no great degree of good grace have put in the weigh scales in accord with their contracts, and so there is no longer any reason for strikes. The house rent which was in arrears is probably largely paid and furnishes no longer any excuse for disagreement. Thus strike activity is on the decrease, and concurrently the improved condition of the coal business has made it expedient to reopen the mines which were closed, though owing to the long period of idleness no small amount of expense had to be incurred in making them fit for operation.

In the northern field of Ohio there is much discontent with the results of arbitration, and the miners of subdistrict No. 5 want to hold a convention to discuss the wage scale, but little can be done by such a meeting as the contract will remain in force till next spring.

In the Hocking field improved conditions have caused almost all the small plants to resume, but the Sunday Creek Coal Co. continues obdurate. It seems likely that if prices improve even that operation will be disposed to take advantage of the bettered demand, continuing however to protest, with some justice, that only unusual conditions make operation feasible. At present the number of miners drawing strike benefits in the Hocking field is reduced from 6,000 to 2,000. A large number of men have left for other fields, some having gone to the nonunion mines of Kentucky and West Virginia.

New Sales Plan for the Central Illinois Operators

The principal coal producers of Fulton, Peoria, Tazewell and Mercer Counties in Illinois have formed a sales plan similar to the one followed by the operators of Franklin County, Illinois. The following companies at present compose the organization, while a few others not yet parties to the arrangement will likely join later: Alden Coal Co., Big Creek Collieries Co., Crescent Coal Co., Eagle Mining Co., Logan Coal Co., Monmouth Coal Co., National Coal Mining Co., Star Coal Company of Galesburg, Silver Creek Mining Co. and Simmons Coal Co.

W. J. Spencer has been elected secretary, with headquarters at Brereton, Ill. It is said that these producers have agreed to report to the secretary, for purposes of comparison, the prices at which all shipments are sold and that schedules will be adopted later setting forth the minimum figures at which the different grades or sizes will be sold in the territory served by these mines. The sales territory will be divided into zones and prices fixed for each zone.

COMING MEETINGS

Illinois Mining Institute will hold its annual meeting on Nov. 20, 1915, at Springfield, Ill. Election of officers will be held and the day will end with a banquet.

American Society of Mechanical Engineers will hold its annual meeting Dec. 7-10, 1915, New York City. Secretary, Calvin W. Rice, 29 West 39th St., New York City.

Coal Mining Institute of America will hold its winter meeting Dec. 21-23, 1915, at the Fort Pitt Hotel, Pittsburgh, Penn. Secretary, C. L. Fay, Wilkes-Barre, Penn.

Engineers' Society of Western Pennsylvania holds its monthly meeting third Tuesday of each month; section meeting, first Tuesday. Secretary, Elmer K. Hiles, Oliver Building, Pittsburgh, Penn.

Western Society of Engineers, Chicago, Ill., holds its regular meeting first Wednesday of each month, excepting July and August. Secretary, J. H. Warder, 1785 Monadnock Block, Chicago, Ill.

Kentucky Mining Institute will hold its winter meeting Friday and Saturday, Dec. 3 and 4, 1915, at Lexington, Ky., with headquarters at the Phoenix Hotel. Secretary, Ivan P. Tashof, Lexington, Ky.

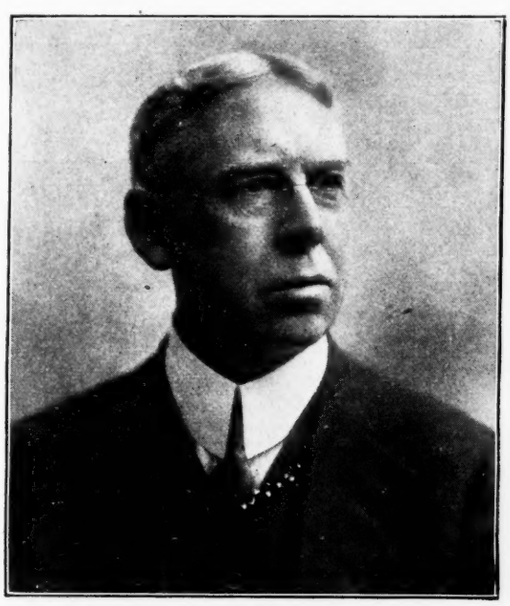
United Mine Workers of America will hold its annual convention in St. Louis, Mo., beginning Jan. 17, 1916, and continuing for three weeks. Secretary-treasurer, William Green, 1102-1109 Merchants National Bank Building, Indianapolis, Ind.

Who's Who in Coal Mining

John Lloyd

John Lloyd is not the kind of efficiency engineer the magazines have made familiar in the past few years. He has not made a specialty of motion study or of the arrangement of machines in a shop, though he knows all about the shop and how men should work. He did not take the title and then try to find out what he knew about efficiency, but after he had grown to be an efficiency engineer in reality the position and title were made for him.

He was born in North Wales, not far from Chester, England. His father was a miner there, but came to America early in life and took up work in the anthracite mines, where he was killed by an accident in 1875. There are



JOHN LLOYD
Efficiency Engineer, Lehigh Valley Coal Co.

two other sons—one president of the Coxe Traveling Grate Co. and the other in charge of part of the electrical equipment of the Central Railroad of New Jersey. The mechanical instinct and aptitude are inherited from the mother whose father and grandfather were successful mechanics.

John Lloyd had three years of schooling before he went to work at the age of 9. His first job was that of doorboy. Work of this kind is not hard, but the boy has to be there and stay on the job, and in those days the hours were longer than they are now. John Lloyd spent the next 11 years at inside work, running hoisting engines and pumps, putting up brattice and mining coal—in fact, doing almost everything in the line of underground work.

In these 11 years the mines were idle for two periods of nearly six months each, on which occasions young Lloyd went to school. The rest of his education was gained when there was time to spare for it, mostly at night. Sometimes he had the help of tutors and sometimes he worked alone. His first diploma was from the International Correspondence Schools for a course in mechanical engineering. At one time while he was erecting the great sand wheels for the Calumet & Hecla Mining Co., he had as assistant a graduate of Cornell, and the two helped each other. The Cornell man gave Lloyd the advantage of his training, and Lloyd gave in exchange the benefit of his experience. John Lloyd did not have much time for school, but he has made himself a well-trained, well-educated man.

After working in the anthracite mines, Mr. Lloyd went to Mexico and to Colorado and worked as a miner in the bituminous mines, and for a short time he was in the Bessemer Steel Works at Pueblo. Then he went back to Pennsylvania to work for the Dickson Manufacturing Co. at Scranton. This company made locomotives and stationary engines, and Mr. Lloyd had the advantage of special training in the shops. Before long he was made superintendent of erection and had charge of a large number of important contracts. One of these was the sand wheels used by the Calumet & Hecla to elevate slimes. These are 54 ft. in diameter. They were erected in 1890 and are still in use.

He spent seven years with the Dickson company, and then went to the Vulcan Iron Works and later became head machinist for the Temple Iron Co. Next he was chief draftsman for the Jeanesville Iron Works, and after 13 months with this company he became assistant to the mechanical engineer of the Lehigh Valley Coal Co. After three years, in 1906 he was made inspector of equipment. His duties became very extensive, and in February, 1914, the position of efficiency engineer was created to fit the work and the man. In this position Mr. Lloyd looks after the condition and performance of all equipment and makes the necessary tests. He also has charge of the first-aid and rescue work. There is a corps of three assistants who handle such work as Mr. Lloyd cannot attend to personally.

With the aid of one of his brothers he invented the Wyoming automatic eliminator to remove water from steam. For a time he devoted himself to developing this and placing it on the market. It was patented in 1898. It is manufactured in this country by W. H. Nicholson & Co., of Wilkes-Barre, and by other companies in Canada and England. The device has been frequently improved and in every way kept up to date; additional patents have been granted from time to time.

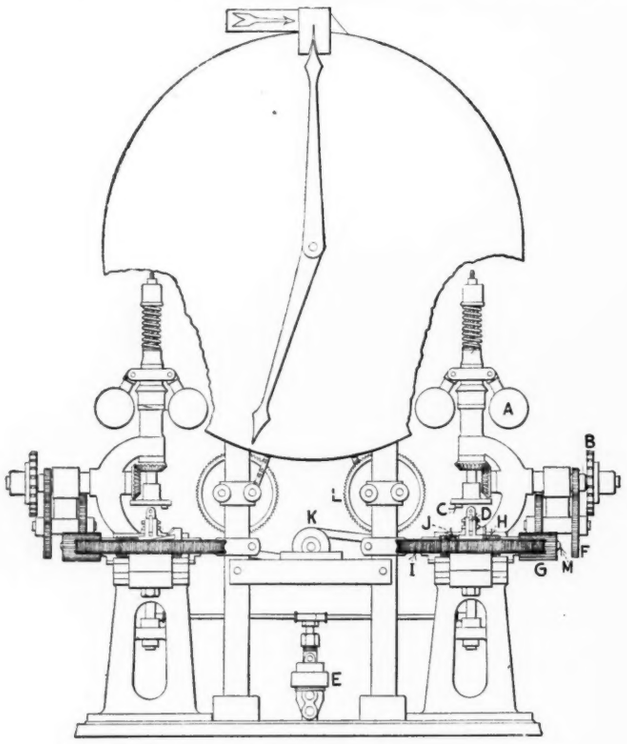
Playing is not much in Mr. Lloyd's line, because he never had much time to learn how, but he admits that he likes to drive his auto. Occasionally he fishes a little, but as far as is known he does not tell stories about it. He is a member of the American Institute of Mining Engineers and of the Engineers' Society of Northeastern Pennsylvania. All of which is a pretty good record for a boy who went to work at 9 years of age.

New Apparatus and Equipment

New Safety Governor

An improved type of overwinding and overspeeding apparatus for use in connection with hoisting engines serving either shafts or slopes has recently been developed and placed on the market by Royer & Zweibel, of Wilkes-Barre, Penn. It is known as the Roybel emergency governor.

The construction and operation of this machine are extremely simple. Referring to the accompanying drawing, the flyballs *A* are driven by the sprocket *B*, which in



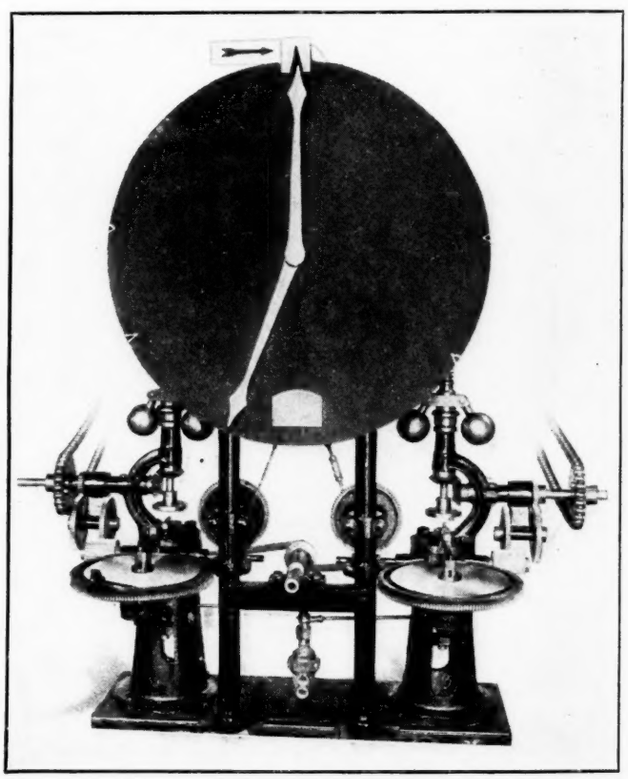
DETAIL OF ROYBEL EMERGENCY GOVERNOR

turn is driven direct by chain from the drum of the engine. The stem of the governor, which carries two separate springs, terminates at its lower end in a disk carrying the pin *C*. As the speed of the engine increases and the balls fly out, the stem descends, and at a predetermined maximum allowable speed the pin *C* clears the lever *D* by a small amount. The flyballs are now opposing only one of the stem springs. If the speed is increased, exceeding the predetermined amount, the flyballs compress both springs, and the pin *C* strikes and throws the lever *D*. This immediately applies steam to the brakes through the three-way valve *E*.

Motion from the sprocket wheel *B* is transmitted through the intermediate shaft and gears *F* and the long pinion *G* to the worm *H*, which drives the wormwheel *I*. Near the rim of this wheel, at a point adjustable to suit the conditions, is placed a double or graduated incline *J*. The arrangement is such that, when the landing is approached, this incline lifts the lever *B* into close proximity to the pin *C*, and unless the speed is properly reduced and the pin *C* allowed to rise with the disk and governor stem, the lever *B* will be thrown and the engine brought to a standstill.

When the hoist is complete and the cage stands in the dumping position, the steep portion of the incline *J* is touching the lever *D*, and any further movement of the cage in an upward direction will apply the brakes. Overwinding, overspeeding and moving the cage in the wrong direction are thus impossible.

The machine is equipped with a dial provided with double pointers—one connected with and controlled from the tight drum and one from the loose drum. The relative position of the pointers then indicates the level being served. As the cage leaves the dumping point the red semaphore at the top of the dial swings down, while



FRONT VIEW OF THE GOVERNOR; NOTE LANDING MARKINGS ON DIAL

when the other cage approaches the dump, a semaphore on the other side appears. This gives a visual indication to the engineer of which cage is to be lowered. This dial thus indicates at all times the exact position of each cage and which landing it is serving.

When the signal to hoist men is given, the engineer gives a return signal by throwing a lever. This not only gives the bottom cager a visual signal (usually an electric light), but by revolving the crank disk *K* moves endwise the worm shaft carrying the worm *H* and pinion *G*, thus revolving the wormwheel *I* until the incline J takes a

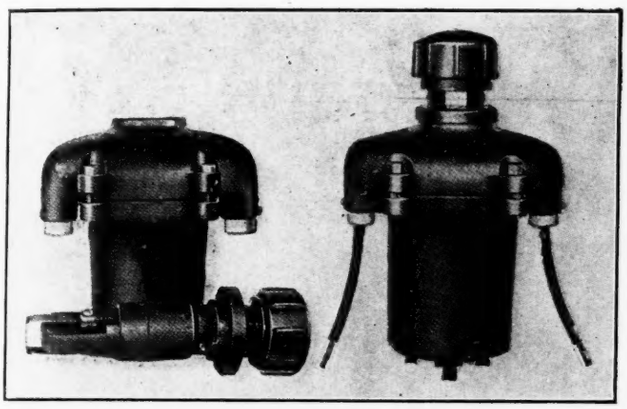
position corresponding to the ground landing. It now becomes impossible for the cage to approach the ground landing at too great a speed or to pass it. A second worm on the same shaft as the worm *H* operates the wormwheel *L*, which through a sprocket chain actuates the pointers on the dial.

As may be seen from the accompanying illustrations, this machine is extremely simple in design, while its operation is positive. Machines of this type have been in use for some time at various mines in the anthracite region and thus far have given satisfaction.

An Oil-Immersed Fuse

An oil-immersed fuse cutout for high-tension work has been placed upon the market by the D. & W. Fuse Co., of Providence, R. I. The unreliability of inclosed fuses on high-tension work is generally known, and a study of the problem involved induced the company to place this oil-break fuse before the public.

There is nothing new in the idea of a fusible wire placed in oil and used as an electric protective device. In the past, however, the design of this piece of apparatus has



FUSE WITH CARRIER REMOVED FOR FUSE RENEWAL; ALSO APPARATUS ASSEMBLED

been crude and its operation as a general thing unsatisfactory. The new type of cutout has eliminated many of the defects in the older forms of this apparatus and has proven satisfactory under severe conditions and over considerable periods of time.

In the new apparatus the fuse and its carrier are immersed in a special oil that prevents the formation of an arc. The body of the device is provided with an effective venting system that prevents any accumulation of pressure within the casing and the loss of any appreciable quantity of oil through blowing out.

The oil container has at its bottom a plug that permits the drawing off of the oil when this becomes necessary. Under ordinary conditions of service, however, this would not require drawing off and replenishment more than once in one or two years.

These cutouts are equipped with flexible cable terminals, to which the line terminals may be soldered. This eliminates the necessity of making complicated connections within the device itself.

At present three capacities of cutouts are on the market, all designed for overhead line construction and being in capacities of 50, 100 and 200 amperes at 2,500-volt pressure. The fuse pieces proper are made from a carefully prepared special alloy of low melting point and high conductivity.

A commercially practicable protected device of this nature is limited as to dimensions and consequent overload capacity. Special precautions have been taken to design the apparatus so as to render re-fusing safe for the operator. A new fuse may be inserted even when the line is short-circuited without risk to the repair man, as the whole device is especially locked against the ejection of the carrier and the oil in case of the unexpected blowing of the fuse during the operation of re-fusing.

This is effected through automatically locking the cover before contact is made with the fuse terminal. The cutout is not intended as a switching device. It may nevertheless be depended upon to open moderate loads when used in this manner.

Recent Legal Decisions

Proving Relationship of Employer in Injury Suits—When defendant in a suit for injury to a miner denies the relationship of employer to the injured man, any evidence, however slight, tending to show who was operating the mines on the day of the accident is properly admitted. (Alabama Supreme Court, Amerson vs. Corona Coal and Iron Co., 69 Southern Reporter, 601.)

Contributory Negligence of Driver—There can be no recovery for death of or injury to the driver of a coal wagon who drove his team at a rapid pace along a street while one wheel of the wagon was in the gutter, although the city may have carelessly permitted the obstruction to exist in the gutter, which, being concealed by snow, caused the accident. (Pennsylvania Supreme Court, Short vs. City of Carbondale, 93 Atlantic Reporter, 254.)

Authority of Corporate Officers—A company engaged in buying and selling coal is entitled to repudiate a purchase of bank stock made by its manager with funds of the corporation, without express authority. Persons dealing with the manager of a business corporation have no right to assume that he has any authority to enter into a transaction beyond the scope of the concern's regular business. (South Dakota Supreme Court, Porter vs. Lien, 153 Northwestern Reporter, 905.)

Discrimination by Railway Company in Furnishing Cars—The fact that coal is sold by a mine owner f.o.b. the mines does not prevent him from securing redress before the Interstate Commerce Commission for unjust discrimination in furnishing cars for shipment of the coal if the shipments are of interstate character. But after he has obtained a ruling from the commission to the effect that the carrier has been guilty of unjust discrimination, it is too late to maintain suit in a state court to recover damages under a state statute on account of the same transaction. (United States Supreme Court, Clark Bros. Coal Mining Co. vs. Pennsylvania R.R. Co., 35 Supreme Court Reporter, 896.)

Effect of West Virginia Mining Laws—The West Virginia Mine Foreman Law does not relieve an operator of the duty of maintaining motors and motor tracks in reasonably safe condition, that duty not being devolved upon the foreman. An operator's failure to adopt or post a rule regulating the number of cars that may be hauled by a motor renders him liable for injury to a miner directly attributable to such failure. A report of a district mine inspector respecting the condition of a mine as to safety is not legal evidence in a suit for injury to a miner, although of course the inspector may testify to conditions found by him. (West Virginia Supreme Court of Appeals, Jaggie vs. Davis Colliery Co., 84 Southeastern Reporter 941.) An operator is liable for injury to a minor employee resulting from failure to warn him against dangers of which he cannot reasonably be expected to know. Such an employee may rely upon his superintendent giving him instructions concerning dangers naturally attending work to which he is assigned, unless by reason of his capacity and experience and knowledge of the hazards of the work he fully appreciates the dangers and proper means of avoiding injury therefrom. (Dillon vs. United States Coal & Coke Co., 84 Southeastern Reporter, 956.)

Editorials

Mr. Dean's Remarks Upon the Output of British Mines

Americans have for a long time wondered at the low output of European mines. When a visitor comes from across the water and the matter is discussed, he usually is quite unable to explain why the countries outside Europe secure larger tonnages per man than do the mines in the confines of that continent.

In a recent paper read before the North of England Institute of Mining Engineers, Samuel Dean, an Englishman, now with the Colorado Fuel and Iron Co., who has traveled extensively in Great Britain, France and Germany and has visited the mines there, states that he has found the answer in the small equipment, especially the small mine cars, in use in those countries.

His advice to the British is the same as that of Michelangelo to Raphael—"amplius"; that is, larger. After being thus admonished Raphael produced those wonderful cartoons that made him famous, and the advice of the artist is scarcely less applicable to the needs of all Europeans who are engaged in trade. They with their interest in embellishment have built beautiful plants; with their instinct for minutiae have developed the preparation of coal for the market to a wonderful degree of perfection. But in the larger matters they seem to fall behind. There is always something hinders them from a large concept of business.

The railroad cars in Great Britain, for instance, have a capacity of only about 10 tons, because the heavier material goes by sea and not by land, because the turntables and bridges would have to be rebuilt if the equipment were made larger, because the local shipper wants a small car and will not willingly combine with his neighbor to take a part of a "goods waggon," and also because the horse-switching would have to be abandoned at the local stations if the cars are made larger. All of which are excuses, not reasons, if the railroads would only see it.

In the mines, the "tubs" must be small; for is not the coal low? do not women in many cases have to dump them? is not the equipment already standardized? are not the ponies too light to haul heavier loads? and so on *ad infinitum*. These also are not reasons as we see them.

The foreigners who visit here are shown our finest mines with the thickest coal. If they were taken to the workings where coal under 3 ft. thick is mined, they would find the roof taken down or bottom lifted and room made for a fair-sized car of great width and suitable gage. They would see that low headings do not involve rats of mules or ponies, but electric haulage.

There are other causes than pigmy equipment for low production in Europe. One is the attitude of the unions, based not so much on pure resistance to authority as on a false political economy. They do not believe a man is paid in what he produces. They believe the company pays what it will and that small production will not involve low pay if union activity is only sufficiently intense. Americans know differently and realize that the baker must bake bread if he would feed many children and the miner must mine much coal if he would have any large measure of prosperity. His brain has not yet been addled by a century of false reasoning.

Moreover, the mines of Great Britain are often extremely warm and enervating, and this fact tends to reduce the tonnage. This can be met partly by a more generous coursing of air, which is in many mines not even equal to that common in the best American practice. The relations between capital and labor can be solved by a sympathetic discussion of the question of wages and profits, and the matter of small units can be corrected by ordering new and larger equipment and giving more attention to the larger problems of production than to the grading of product and the building of mammoth power houses. These latter details are important, but they take second place compared with volume of output whereby marked economies can be secured.

The Colorado Settlement

The settlement between the miners and the Colorado Fuel and Iron Co. is a great triumph for everybody. Peace, harmony, the reëstablishment of industry are blessings not to be regarded lightly, but it is absurd for the organizers of the strike to claim it in any sense as a victory of their arms. The true success has been the renewal of the order they destroyed and the peace which they violated.

At best the company has made a contract with its men to deal with them under that instrument as it dealt with them before without it. Wages have not been raised; the hours, which were already 8 hr. per day, have not been shortened; checkweighmen, not denied before the strike, are permitted by contract now.

The four achievements were the bringing of Rockefeller to Colorado, the formation of the arbitration committees, the provision which practically secures that men shall not be discharged for incompetency or any other reason than the violation of a recognized offense and the promise to raise wages synchronously with competing fields. For none of these things was the strike started. Unless the recognition of the arbitration committee is considered as tantamount to an acceptance of the union, which that organization vigorously denies, there is nothing in the instrument covering those demands of the union to which the company had refused to concede.

The best policy of the union will be to leave the coal mines of Colorado severely alone for the present. If the existing arrangement is loyally followed by the Colorado Fuel and Iron Co., and other operating concerns imitate it, the men will have all the union promises, and Colorado competition will not make other states reduce their mining price. If the agreement is not followed, then the union will have some reason to try to invade Colorado again.

But so long as the men in Colorado are getting their just dues the union may well keep away, remembering

that the purpose of the union is not, or should not be, to promote strikes and can never rightly be to seek its own aggrandizement. Its excuse for being can only be found in its promoting the interests of the workingman when those interests are assailed. Like many other organizations, the union is apt to be started for a well-defined purpose, and ultimately its work is extended, not so much for that purpose as for the good of the order.

Meanwhile the operators of Colorado will do well to watch their conduct and not give the union an excuse for anything but a merely perfunctory activity. And the union men allowed to remain within the camps may prove by their conduct that the union button is not a badge of disorderliness, but a mark of honor. There is too much talk of the "eternal conflict," as if war between capital and labor were an end in itself, instead of an abnormal condition only existing when one or the other is at fault.

West Virginia's Trade Prospects

Any paper one may pick up from West Virginia assures us that the state is about to go into bankruptcy as the result of an increase in freight rates that will make it impossible to operate the coal mines. Such a volume of untruth has been unloosed about this matter that it really becomes any paper having a duty to the coal industry and to the public to print the truth of the situation without fear or favor.

Really *Coal Age* cannot believe that the change is going to do any more than prevent a certain undesirable condition from continuing any longer. For a long time the operators of Ohio and Pennsylvania have been transferring their capital from those states to West Virginia. Year by year they have closed down their plants in manufacturing states, where coal and the means of its utilization are located side by side, to open up in a state where a lower wage scale prevailed and a lower ton-mile freight made access to outside markets easy.

These conditions have built up West Virginia. No one wishes to see that state idle; no one desires to see its plants abandoned. But conversely no one would desire that the people in the neighboring states be unemployed and their mining improvements rotting to the ground.

The action of the railroads passing through West Virginia being more generous to that state than to other states adjoining has had this latter effect. Bankruptcy and dormancy are normal conditions for plants in both the Buckeye State and the Keystone State.

Some of the operators in West Virginia who are strongest in defending those conditions in the state that have injured other commonwealths have idle holdings in Pennsylvania and Ohio, and they know that these are facts that have just been stated, and their former employees also know it, for until the recent generous accession of business these miners were idle nearly all the time.

But it cannot well be expected that West Virginians would willingly see the locust pass over that state as it has passed over Ohio, if it could be possibly avoided, no matter what may have happened in the past. People must be willing to see justice done *now* and pass a ready statute of limitations to cover the past. No group of industrial workers must suddenly be deprived of work; no tipples, shafts or villages must be allowed to decay by a too-sudden righting of unnatural conditions.

But if Col. J. W. Dawson it to be believed, that is just what is going to happen in West Virginia. In his address before the State Board of Trade at Fairmont he asked, "What would happen to the banks if $75,000,000 annually, or $250,000 daily, should be hereafter cut off?" The question is insincere, for no one believes, and certainly not Colonel Dawson, that the whole coal trade of West Virginia, east and west, is going to be utterly destroyed by an increased freight rate of 15c., or barely 10 per cent., which moreover affects only the western trade.

The new freight rate will not affect the New England business. It will not modify the condition of the bunkering market at Tidewater. It will not affect any of that European trade which West Virginia so cheerfully anticipates. In most places the only effect will be to increase the cost of coal to the consumer 15c.

In some places perhaps Ohio coal, securing by the new freight rate a larger price of 15c., or even a part of it, will be able to do business and compete with West Virginia coal, but for the most part the West Virginia people will add the freight to the cost of coal, and they should be grateful that they are allowed to do that. If they came to New York City like the anthracite operators, they would be apt to be told by the newspapers that increases of wages, of freight rates and of taxes and the imposition of new working conditions should not cause them to change the cost of coal one iota.

Col. J. W. Dawson alleges conspiracy, but the operators of the states which neighbor West Virginia, while not so ready to quarrel among themselves, are by no means so anxious to combine. There has been little enough unity among these operators, who have a common need. But when they went to convention and met the miners they told the latter that if the union compelled them to grant an increase the union must compel the West Virginia operators to be as generous. And the union promised to do so.

Such a demand is only right and just and no crime. The whole convention between miners and union is a like conspiracy; for do they not one and all declare that the changes in the agreement in one part of the unionized field shall be like those in every other?

It is stated by a press agency, which is spreading Mr. Dawson's remarks for the enlightenment of the public, that "Mr. Dawson also showed that if West Virginia could market her coal on as favorable conditions as Pennsylvania, the values of coal lands would grow from $100 to $200 per acre, their present values, to $1,500 to $2,000 per acre, the value that obtains in Pennsylvania."

Now there is no reason why a state remote from the market should be granted such rates as will put her on a perfect parity with another state having a market at the point of mining. The operator does not have a right to charge the same price for coal delivered to the merchant in Morgantown as he does to the dealer in New York. But overlooking that matter, the statement that coal land sells in Pennsylvania for $2,000 per acre is probably only true of part of one county. Little of it sells at any such figure. Much of it is selling for from $25 to $150 per acre.

Nor is it true that all the coal in West Virginia sells from $100 to $200 per acre. Some of it is held at even lower prices while some is not on the market at all. Some few years back a large area in the Pocahontas field could be leased only on paying a lump sum of $25 per

acre for a lease, which conferred merely the right to mine coal for 15c. per ton. This coal had to be extracted according to a prescribed method, and as the seam was 10 ft. thick it could not fail to produce 15,000 tons to the acre. Thus the ultimate return per acre would be $2,275. So, after all, owing to the gracious consideration of the railroads by which the state has been developed, the conditions in West Virginia, despite its youth and geographical isolation, have not been unfavorable.

The average operator in West Virginia is like those in every other part of the Union. His notions of right and wrong are broadly based on justice and common-sense. He smiles and must continue to smile at the hotheads who misrepresent him. And indeed perhaps they smile altogether too much at men who do the State of West Virginia little credit by their unfair representation of its case.

The reputation of the state is worth something. When the word of the operators is once disregarded as a negligible thing, they will not be heard later, cry they never so lustily in their own defense. It is time that the sober-minded operators take a strong hold on the wheel and direct the campaign of the operators of the state along the lines of reason and self-respect.

Mr. Foster Comments Upon the Consolidation and Expresses Appreciation to Friends

Practically every coal-mining man familiar at all with the fuel industries at large is acquainted, either personally or otherwise, with Rufus J. Foster, who has managed *The Colliery Engineer* for so many years. It is fortunate that the new and enlarged paper will have the good-will and frequent advice of Mr. Foster. It would be difficult to imagine the perpetuation of *The Colliery Engineer* without his name and personality closely linked with its conduct, no matter in what form that might be. Mr. Foster says:

RUFUS J. FOSTER

"The consolidation of *The Colliery Engineer* with *Coal Age* means the production of *one* superlatively good coal-mining periodical in place of two.

"It means that the former subscribers to both *The Colliery Engineer* and *Coal Age* will receive in one periodical all of the best features of the two papers. Thus there will be no duplications of articles on technical mining subjects or of other coal-mining information.

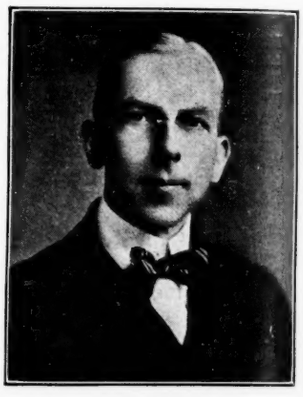
"It means to advertisers one medium filling the field formerly occupied by two, and that one medium reaching the entire field in the most desirable manner.

"While the consolidation means so much for both the subscribers and advertisers in *The Colliery Engineer* and *Coal Age,* I cannot help a feeling of sadness and sincere regret that the many years of pleasant relations that have existed between me and the friends of *The Colliery Engineer* are, to a certain extent, officially terminated; the only compensation being that I know the consolidation means a benefit to the patrons of both papers and that it allows me more time to devote to important duties as an executive officer of the International Textbook Co. and the International Correspondence Schools.

"While I shall not be officially connected with the new and enlarged journal, I will be in a measure connected with it in an advisory capacity and as a contributor, and I sincerely request that my many friends in the coal-mining industry will continue to give to Mr. Parsons, his assistant editors and the advertising representatives the same consideration that has always been extended to me and my assistants." RUFUS J. FOSTER.

Mr. Young Continues His Editorial Connection

The new weekly that results from the combination of *The Colliery Engineer* with *Coal Age* will be represented by C. M. Young in the anthracite field. Mr. Young has been persuaded to continue his editorial work as an associate editor of the enlarged journal; thereby bringing to the consolidated paper all the experience, plans and incompleted effort that he has initiated in behalf of *The Colliery Engineer* in recent months. Mr. Young will concentrate his attention principally upon the hard-coal fields, which plan will afford the new paper better service than has ever been possible with either of the old papers singly. Mr. Young's good work on *The Colliery Engineer* made for him many strong friends throughout the country, and especially in the anthracite field. His ready understanding of editorial duties and his broad conception of this class of educational work leave no doubt that readers of the consolidated journals will profit by his editorial efforts. He says:



C. M. YOUNG

"The consolidation of *The Colliery Engineer* with *Coal Age* makes possible the publication of a coal-mining periodical which can satisfy the needs of everyone connected with the production and marketing of coal and coke.

"*The Colliery Engineer* was preëminently a technical magazine. Founded in the anthracite district of America, its interests had extended to all parts of the world. Now that it has been joined to *Coal Age,* its new publishers are entitled to the friendships that it had won, and the opportunities of the combined papers for service are greater than those of either alone and greater than the sum of these.

"I am personally glad to retain connection with the combined papers as the representative in the anthracite field. I hope that the friends of *The Colliery Engineer* will realize that the new publishers desire to retain their good will, that all that was good in either paper will be continued in the new form and that the new paper will serve them better than either of the old papers alone could do." C. M. YOUNG

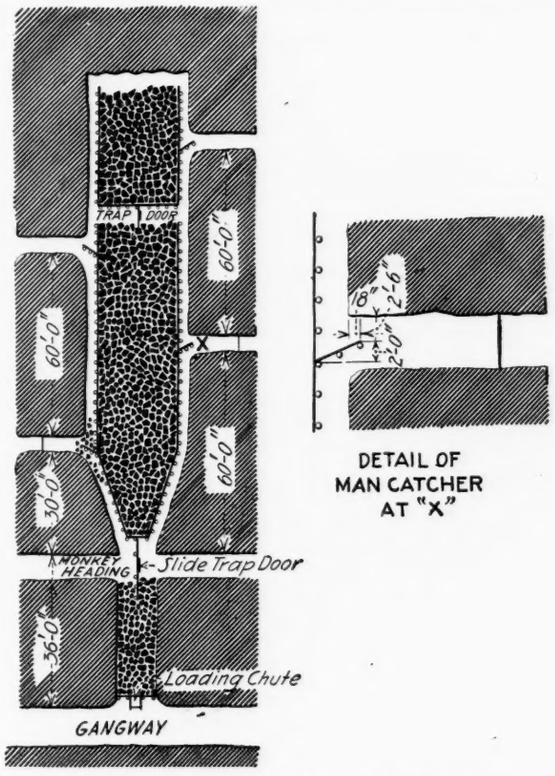
Sociological Department

Susquehanna's Safety Methods

By R. Dawson Hall

SYNOPSIS—The Susquehanna Coal Co. has, with gratifying results, carefully investigated all the conditions at its collieries with the intention of reducing accidents. Some of its methods are here detailed. Especially interesting is the "man catcher" for steep pitches.

The Susquehanna Coal Co. has carefully utilized all its native talent to ascertain unsafe conditions in its mines, but it has not been content with this. It is well known that the coal company was formerly affiliated with the Pennsylvania R.R. Owing to this earlier connection it

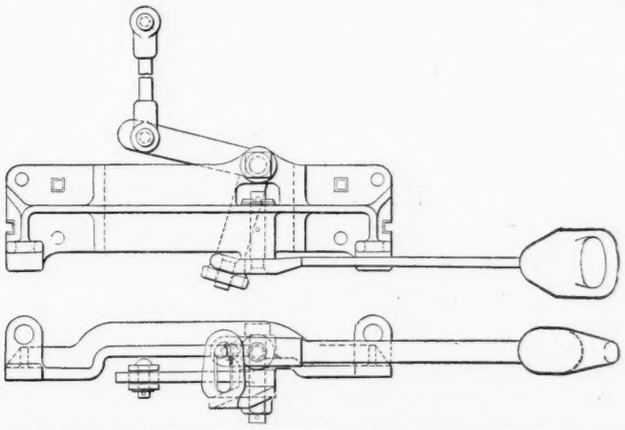


MANCATCHER AND SAFETY BATTERIES

has been enabled to draw on the resources of the parent company, and in that way has been able to learn much that does not readily enter a mining company's experience.

A company mining coal is duly impressed with its accidents from haulage and roof falls, but its men so rarely have eyes put out by flying steel or their clothes caught in gears or setscrews that matters of that kind get less consideration than they deserve. Still such accidents are liable to occur where there is unprotected machinery; and any superintendent from a large railroad shop would be sure to note such conditions, whereas a mine superintendent would be apt to be utterly indifferent. He could see the danger, but he would not have had the experience that would force the importance of the matter upon him. So the Susquehanna, desiring to find all the dangers possible and to learn as little as necessary from so expensive a teacher as experience, has sought to get all the light it could from people who are experienced in kindred lines and who have paid for their knowledge often in terms of human lives.

There is always a disposition to get mining men to criticize mining methods, whereas in the matter of machinery at least the outsider is often better qualified to throw an entirely new light on the problem of safety, both by his larger experience in the type of accidents to be avoided and by his acquaintance with other books and people. This new angle of view, or even an element of remoteness and lack of acquaintance with the dangers to be avoided, has its value. A man who has



A SWITCH WHICH THROWS PARALLEL WITH THE TRACK INSTEAD OF AT RIGHT ANGLES

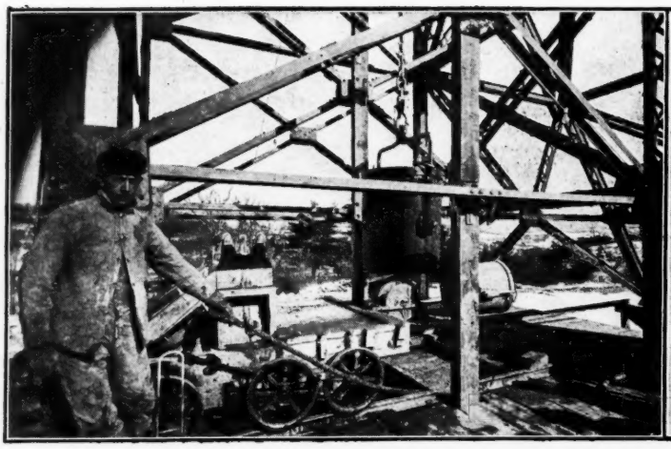
experienced any particular line of dangers repeatedly does not react as readily to them as one who sees them for the first time.

The investigation by all classes of experts has not been without actual results. The fatality rate has fallen from 32 in the first eight months of 1914 to 17 in the same period in 1915, or nearly 47 per cent.

Device to Protect Men Falling in Manways

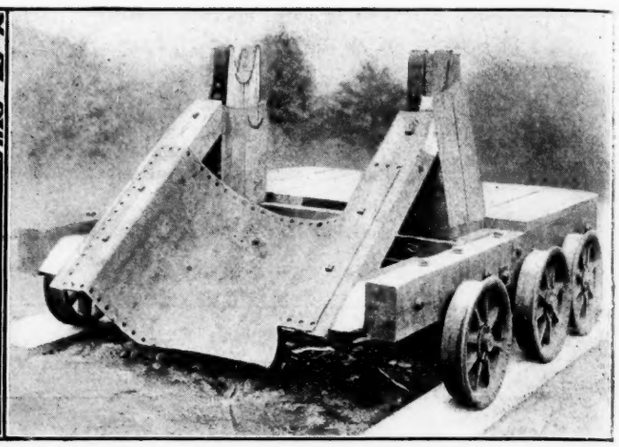
Among the new safety developments is one at Williamstown colliery in the Lykens division of the Susquehanna Coal Co. This is illustrated in this article. It is designed to reduce the seriousness of a fall down a steep manway and is called the "mancatcher." Another feature illustrated in the same plan is the "safety battery," which is placed every 100 ft. Mancatchers are built in at every crossheading, so that if a man falls he does not hurtle the full length of the battery, but only to the nearest mancatcher, which is located at the adjacent crossheading and is in no case over 60 ft. below him.

These mancatchers also protect the miner or laborer when he is traveling up the manway from anything which



SINKING BUCKET TRUCK AND SAFETY GATE AT NANTICOKE NO. 8

The safety cover is pulled over the shaft by the rope in the hand of the head tender



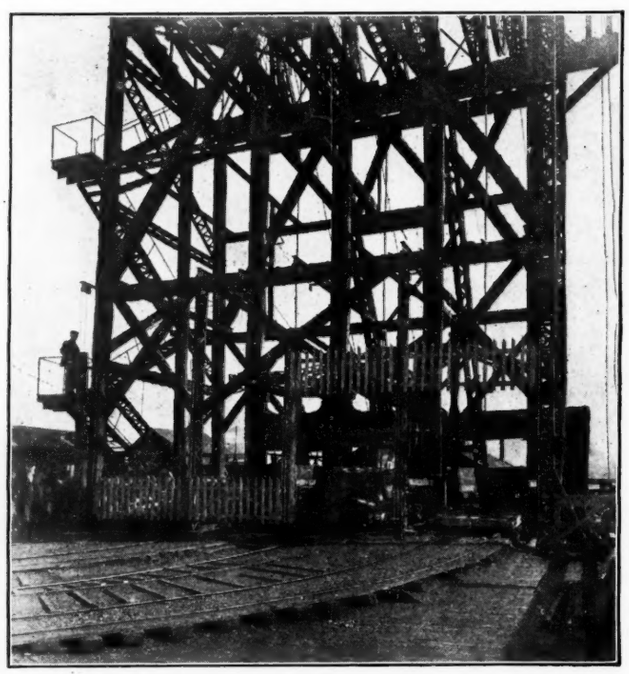
ANOTHER VIEW OF DUMPING TRUCK ON WHICH THE BUCKET IS LOWERED

The third wheel on each side spans the gap in the rails left for the shaft guides

may start to fall down on him. The mancatcher extends from the filled battery out 18 in. into the crosshead ing. This passageway is only 5 ft. wide, but the miner is readily able to pass around the mancatcher in climbing into his place. The device is simply constructed of three props which are planked from top to bottom.

The safety battery is placed every 100 ft. and is so contrived that if anything goes wrong a man can take a shortcut through the sliding trapdoor instead of traveling up to the face of every room in order to reach a place of safety. It is the end of the room which is most likely to be dangerous. Where there is the support of the broken coal, as in the center of the room, the danger is not so imminent as at the working face; so the trapdoor at every 100 ft. gives a real assurance of safety to every workman.

The company expects to reduce track accidents by using the switch stand illustrated herewith. In throwing the switch, as will be noted, the switchtender throws the lever in a direction parallel to the track instead of at right angles to it. Consequently, if he pitches forward in doing so, he does not fall over the rails, but alongside the track. He consequently does not run nearly so great a risk of falling into the cars and being killed.



SAFETY GATES AT HEAD OF SHAFT AT NANTICOKE COLLIERY NO. 7

They prevent the miners from entering cage from both sides of shaft

Care to Avoid Accidents in Shaft Sinking

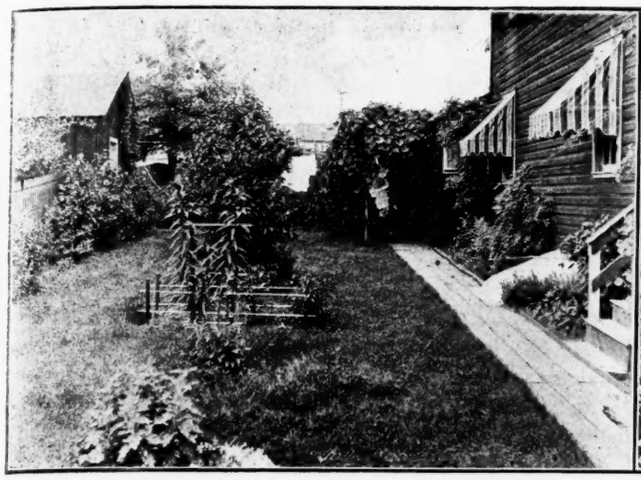
Shaft sinking has an unenviable reputation as a source of danger when the small number of men engaged in that work is considered. The fatality rate is high in percentage even though the actual loss of life from that source is not great. As a shaft in process of sinking is not a mine the records hardly reflect the fatality rate as they should.

The definitions of the law in many states relieve new shafts from the official visits of mine inspectors. New projects often do not employ the required number of men, they are not producing coal and therefore are not mines, and they are so remote that frequent visits to them would occasion much loss of time and the expenditure of much trouble. Hence, records of shaft-sinking accidents are probably not complete.

The Susquehanna Coal Co. has adopted many means for preventing these accidents at the new shaft No. 8 being sunk near Nanticoke at Nanticoke No. 7. There is always risk of a piece of rock or a tool falling on the men working at the bottom of the shaft. To prevent this a safety cover is pulled over the shaft opening by a rope, which in the illustration is being held by the head tender.

This cover is put in place after the bucket is lifted and before the safety truck is pushed into place. In addition there is another pair of safety covers under the one shown. The shaft is being sunk without the use of any naked lights, electricity being used exclusively for lighting. The reel by which the lights are raised and lowered can be seen under the hanging bucket. There are contacts on the side of the reel which provide a continuous lighting current in the system regardless of the length of wire that has been unwound.

The dumping truck for the shaft-sinking bucket is shown in another illustration. The bucket is hoisted high enough to allow the truck to be pushed under it. As soon as the shaft doors are closed the bucket is low-



YARD OF A SHAFT ENGINEER AT SCOTT COLLIERY WHICH TOOK FIRST PLACE

The award was made not only for the flowers and lawn shown but for the vegetable garden in the rear. John Moore, the tenant, is an employee of the Susquehanna Coal Co.

POSEY GARDEN OF FRANCIS SCHUCK, A MINER AT PENNSYLVANIA COLLIERY

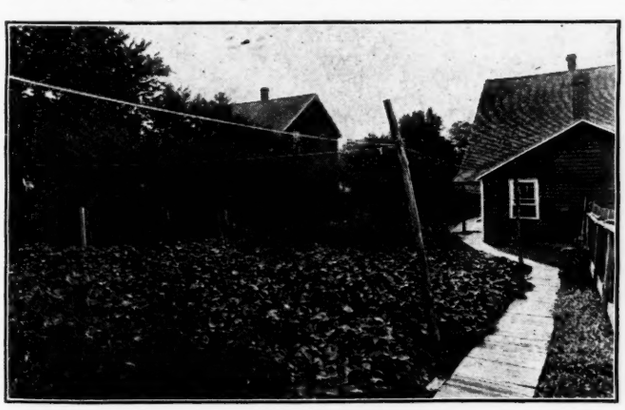
Rear part of garden devoted to vegetables and poultry coops and kept in neat and sanitary condition. Second place was awarded.

ered, unhooked and pushed on the truck to the edge of the platform, where it can be dumped. The truck has three wheels on each side so that it can span the gap in the rails necessarily left for the shaft guides and the passage of the billy. The wheels are so disposed that the truck always rests on four wheels and is not tilted even when it is passing over the gap in the rails.

Safety Gates and Their Shrouded Counterweights

Another illustration shows the head of the shaft at No. 7 colliery, Nanticoke; and the reader has his attention called particularly to the safety gates which are placed so as to prevent men from getting on the cage from both sides of the shaft. They are thus obliged on entering the cage to pass by the head tender. The foreman on the left is pointing to the gaspipe guard surrounding the counterbalance weights which prevents the latter from injuring anyone should the counterweights break loose.

Excellent living conditions go hand in hand with safety. If a company's towns are undesirable places, the best men do not come to work in its mines and those that are there leave. The better element of citizenship is not present in a rough-and-tumble village to control the less amenable members of the community. For after all, the restraint of the good workingman on his fellow is worth all the company discipline which can be imagined.



GARDEN OF FELIX WITCOPSKI, A MINER AT LYTLE COLLIERY

This garden took third place, not because of its beauty but because of its great productivity

Probably reasoning partly in this manner the Susquehanna Coal Co. has encouraged gardens, and the towns no longer look like their former selves. The work is not done for money prizes, but competitions are held, and gardens are rated not alone for beauty but also for productivity. Some of the lost time of our colliery villages is redressed by the work done in the gardens, and many a wanton action is prevented because the gardening work consumes energies which have to find a vent somewhere.

Accident Prevention and First Aid*

By H. S. Salmon†

SYNOPSIS—The author questions which is the more important, safety first or first aid, and whether the emphasis on the first of these should be laid on the education of the workman or on the provision of safeguards. He designates first aid as "picking them up as fast as they fall" instead of saving them from falling.

The ancients regarded lightning as a demonstration of the wrath of the gods whom they worshipped. They sought no further explanation, but piously put out the fire and repaired the damage done by the thunderbolt or, in the case of the early Romans, walled the place about and consecrated it to the god of lightning.

It has taken many centuries to turn the eyes of man from the effects of lightning to its cause, to prove its identity with electricity and to use that knowledge for the good of humanity. In other words, as regards damage from lightning, it has taken a long time to see that the lightning-rod and the fire department are the ounce of prevention and the pound of cure.

And in other similar matters the same misjudgment has been made. The results of accidents have made such a

*Article read before the Alabama Safety Association, Birmingham, Ala., entitled "Accident Prevention and First Aid—Their Relative Importance."

†Safety inspector of ore mines, Tennessee Coal, Iron and Railroad Co.

strong impression that they have overshadowed the causes. We are apt today to see similar events occur time after time before we associate them with a common cause. Safety organizations and individuals interested in safety must carefully guard against this error. In the conservation of men the study of the causation of accidents must certainly precede every other phase if we are to have any success in reducing fatality and accident rates.

Our problem is not short-lived, but is of as long duration as the occupations which we follow, and will constantly become more complicated with the development of machinery and with changes in methods. The advent of labor-saving machinery was met with violence and disapproval for fear it would displace the workman, but today he is as necessary as he ever was. It is vitally important, therefore, that we determine the proper lines of endeavor and classify them in the order of their importance.

How seldom when an accident happens do we give the result our entire consideration. Our attention is turned to the man who is hurt, and later perhaps to his needs or those of his family. We lose sight of the cause of the accident or, like the Romans, wall the particular spot about with a safeguard and consecrate it to the god of bad luck. Yet there still remains unsolved the problem of protection for the thousands of other men who must work in that mill or ride that train or go into that mine.

Safeguards in Mill; Education in Mine

To each of us safety first has a different meaning. We look at it in the light of the problems we are called upon to solve, but all safety problems have a great many elements in common. The principal factor of solution in the mine where conditions are constantly changing may be education; in the factory, where machinery and men have fixed positions, safeguards; yet education and safeguards are important in both places. What the other fellow has to contend with and how he does it is going to have a bearing on the general problem and will interest and broaden all of us.

The best way to determine which subject is the more important for study is to determine that which renders to the individual workman the more valuable service. Take the case of John Smith, a workman of average intelligence and with a number of years' experience. He does his work as he learned to do it. He has had first-aid instruction. In the course of his duties he passes by a piece of board with some nails protruding from it. He is in a hurry, and if he thinks of it at all probably says that he will not have to pass that way again. In this he is only human. How many automobilists, having safely passed such a board on the road, would return and throw it aside? Another workman follows Smith who is naturally less alert or perhaps has kept late hours the night before. He steps on the nails and is injured. Smith hurries him to the hospital, and in consequence the man is laid up for only a few weeks.

Later the management introduces a safety campaign, and Smith gradually becomes accustomed not only to noticing but to looking for and removing dangerous conditions. The other workman could follow him now without accident and has himself absorbed enough of the spirit of the movement to avoid dangers unconsciously. The result is that Smith is put to much less trouble in removing or reporting dangerous conditions than he was in taking his fellow-workman to the hospital. The fellow-workman not only does not have to suffer pain, but will in time be one of the army of Smiths who make things safer for the men who follow him.

Every accident is either the result of unusual conditions or the result of some irregularity such as carelessness, fatigue or stupidity within the man himself. The terrible mine explosion which now and again strikes the industrial world like a thunderbolt can often be traced to a careless or stupid miner coming in touch with abnormal gas conditions. When a man, careless, indifferent or untrained in safety, comes in contact with an unusual situation an accident is almost bound to happen. A plan of thorough safety education is the only lightning conductor which will make that contact without danger and without damage.

This paper does not attempt to answer the question as to the relative importance of first aid and safety first. It is merely intended to invite discussion of it. But if we are to have an ideal which we are going to strive to attain it must certainly be based on the principle that thorough and perfect preventive measures will eliminate the necessity of first aid.

The following poem from the "Travelers Standard" tells this same story so well that it is here given in full:

THE PARABLE OF THE DANGEROUS CLIFF

'Twas a dangerous cliff, as they freely confessed,
Though to walk near its crest was so pleasant,
But over its terrible edge there had slipped
A duke and full many a peasant.
The people said something would have to be done,
But their projects did not at all tally.
Some said, "Put a fence round the edge of the cliff";
Some, "An ambulance down in the valley."

The lament of the crowd was profound and was loud,
As their hearts overflowed with their pity;
But the cry for the ambulance carried the day
As it spread through the neighboring city.
A collection was made to accumulate aid,
And dwellers in street and in alley
Gave dollars or cents, not to furnish a fence,
But an ambulance down in the valley.

"For the cliff is all right if you're careful," they said,
"And if folks ever slip and are dropping,
It isn't the slipping that hurts them so much
As the shock down below—when they're stopping."
So for years, we have heard, as these mishaps occurred
Quick forth would the rescuers sally
To pick up the victims who fell from the cliff,
With the ambulance down in the valley.

Said one, in his plea, "It's a marvel to me
That you'd give so much greater attention
To repairing results than to curing the cause;
You had much better aim at prevention.
For the mischief of course should be stopped at its source
Come, neighbors and friends, let us rally;
It is far better sense to rely on a fence
Than an ambulance down in the valley."

"He is wrong in the head," the majority said;
"He would end all our earnest endeavor.
He's a man who would shirk this responsible work,
But we will support it forever.
Aren't we picking up all just as fast as they fall
And giving them care liberally?
A superfluous fence is of no consequence
If the ambulance works in the valley."

The story looks queer as we've given it here,
But things oft occur that are stranger.
More humane, we assert, than to succor the hurt
Is the plan of removing the danger.
The sensible plan is to safeguard the man
And attend to the thing rationally;
We should build up the fence and thus try to dispense
With the ambulance down in the valley.

Discussion by Readers

Valuation of Coal Lands

I want to thank Francis G. Welles for presenting in a different form a clear analysis of the operating figures used in my article published in *The Colliery Engineer,* September, 1915, p. 64, entitled "The Valuation of Coal Lands." Mr. Welles's objection to my manner of using these figures appears to be directed at the extension I have given to the usual definition of the term "profits." Mr. Welles states, in part, as follows: "There is only one state of affairs when interest on the investment may properly be charged against operating cost, and that is when a portion of the capital has been borrowed."

In the balance sheet under discussion I have simply carried this state of affairs a step farther and assumed that all of the capital has been borrowed. Such a state of affairs is by no means uncommon in the coal industry, although it seldom occurs at the beginning of operations. Later, when adequate production is assured, it happens with some frequency. However, if it had never happened, I think it would have still suggested itself to an engineer as a ready means of determining the commercial status of a given mining proposition.

The risks inherent in any coal-mining proposition demand profits in excess of the rate of interest current in the locality in which it is found, for the reasons set forth in the article. It is the excess with which my balance sheet concerns itself. While technically it shows only the profit of the *entrepreneur,* known as the operator in the coal industry, practically it shows and names as profit that portion of income without which the proposition is valueless. Profit is necessary, not only as a reward for the experience, enterprise and business sagacity of the operator, but as an inducement to capital to turn aside from investments that promise far greater security.

I think that, without impairing the value of the method to the engineer for trying out the working value of mining propositions, I may agree with Mr. Welles's contention that, as industrial operations are customarily financed, my balance sheet covers up some of the technical profits.

Pittsburgh, Penn. W. E. FOHL.

Handling Explosives in Mines

Letter No. 3—When reading the short editorial that appeared in *Coal Age,* Vol. 7, p. 937, inviting discussion by men of experience in the handling and use of explosives in mines, I concluded that this would make a very interesting and instructive subject:

Practice in the Cahaba Coalfield

Having had some years of experience in the handling of all kinds of explosives, I want to offer a few comments on the general practice of blasting coal in the Cahaba coalfield, in what is known as the "Eureka Basin," 18 mi. from Birmingham, Ala. Here, the main slope entries are driven to the full dip of the seam and water levels turned to the right and left off the main slope. The rooms are driven to the rise of these levels, on all inclinations from 5 to 75 deg.

The seam known as the "Helena seam" will average 4 ft. in thickness, and the general practice has been to shoot the coal off the solid, using black powder and fuse. Except in one or two places, squibs are not used to fire the shots. The miners claim that fuse works better, owing to the wet condition of the holes in this seam. The attempt to use permissible powder, in this seam, has only met with partial success. The miners claim that, first, it is too expensive and, second, it does not give as good results in breaking down the coal. Many of the operators also claim that, by the use of black powder, better grades of coal are obtained for domestic use. The mines load three grades of coal—namely, lump, nut and slack—the slack being much used for steam purposes.

System of Handling Explosives

The system adopted for the handling of explosives at the mine is as follows: The miner gets his powder at the magazine in the morning, from 6 to 7 o'clock. Each miner, before going into the mine, leaves his supply of powder at the tophouse, marking the powder with the number of his heading and room. The drivers deliver to each man his supply of powder, which is placed at once in his box, and the latter is locked. A miner is allowed to keep on hand only one keg of powder or one carton of stick powder. They make their own cartridges, using a stick 1½ in. in diameter for this purpose.

Blasting the Coal in Two Benches

The Helena coal seam is composed of two benches of coal, which are separated by a 4-in. parting. The bottom bench being the hardest and strongest coal, it is the general practice to shoot the top coal first. The work is carried forward, thus, in two benches or steps, the face of the top coal being kept a short distance in advance of the lower bench. The general practice in blasting the coal is to drill a hole not over 6 ft. in depth and so inclined toward the loose end that the shot will not measure over 4 ft. at the heel. At times, shorter holes are fired, depending on the coal to be broken down. Clay is furnished the men for tamping.

Bad Practices in Shooting Coal

There is a bad practice among heading men, who quite generally adopt what is known as a "cracker shot." The hole is drilled straight in the solid coal a distance of 6 ft. In some cases, two such holes are drilled one above the other, and this is known as a "double cracker." The coal is then mined or sheared 3 ft., leaving the other 3 ft. of the hole in the solid coal. When this shot is fired with "monabel" the coal that is mined or sheared is broken down, while the coal behind this is cracked by the explosion of the charge, which is located in the solid.

This practice, while dangerous, affords the miner easy cutting for the next shot. The mine inspectors have con-

demned the practice and are striving hard to bring about its disuse; but, as one of them stated to me not long since, it is difficult to enforce discipline in the mine. It is easy to see that if both the operators and the miners would take the precautions suggested by the inspectors, accidents resulting from blasting would be reduced to a minimum.

There is always danger of a windy or blownout shot when blasting coal off the solid, or whenever the powder is not given an opportunity to perform its work. Blasting off the solid requires the best judgment of an experienced miner, having a thorough knowledge and acquaintance with the kind of coal blasted, in order to avoid what is known as a "tight shot." An inexperienced miner will often increase the charge of powder, with the result that the shot blows its tamping or pulverizes the coal, producing much fine dust.

Another bad practice in this district is the firing of two or more dependent shots. It frequently happens that the second shot goes off before the first or the first shot may fail altogether. In either case, the result is almost sure to be a blownout shot.

Let me suggest the precaution of making up all cartridges outside of the mine, these cartridges to be carried into the mine in canisters. I would also recommend that every hole should be examined, charged and fired by a competent person. When miners charge and fire their own holes, they frequently tamp these with coal dust, which produces a large amount of flame when the shot is fired and burns up the oxygen of the air to such an extent that the place is unfit for work the next day. I have often had my light extinguished when examining a place owing to this practice of miners.

Maylene, Ala. ROBERT GIBSON.

Efficient Mine Foremen

Letter No. 11—In discussing the efficiency of the mine foreman, the question should not be limited to his proficiency in the ventilation of a mine, as would appear from the first letters written on this subject. There are many other things that an efficient mine foreman must know that will measure his capability for filling successfully that position.

VENTILATION AND EFFICIENCY

It is true that good mine ventilation forms an essential part of the work of a successful foreman; but, however thorough the ventilation of the mine, if other important things are neglected, the foreman in charge could not be styled "efficient."

To illustrate this point, while district mine inspector I visited a small mine where the ventilation was very defective, owing to the neglect of necessary doors and brattices in the mine. The foreman in charge had been there but a few days and promised that he would improve the ventilation in a short time, which he did in a satisfactory manner. A little later I had occasion to call the attention of an operator of another small mine to the need of better ventilation and, in doing so, referred to the improvement that had been made in the mine I have just mentioned. The superintendent asked the name of the foreman who had made the change and, on being told, replied: "Yes, I know that fellow. He is certainly good in ventilation, but a complete failure in everything else connected with a mine." Later developments proved this to be the case.

A mine foreman may improve the conditions in regard to ventilation and at the same time permit the mine to become dry and dusty to a dangerous extent. Or he may look closely to the ventilation and keep the mine free from dust as well, but neglect his haulage roads and the drainage of the mine, until the output of coal is so reduced that the mine is no longer operated on a paying basis.

WHAT EFFICIENCY IN MINING MEANS

A good definition of the word "efficiency," in reference to the operation of a mine is the ability to accomplish what one undertakes and thereby reduce the cost of production. An efficient mine foreman is one who has attained a high average in all things pertaining to safety and economy in mining. In the operation of the mine the efficient foreman looks both to the interest of his employer and that of the men in his charge. He neglects no duties that pertain to his office and, as far as possible, permits no condition to exist in the mine that will endanger the life or impair the health of the men in order that the output of coal may be increased a few tons or the expense account reduced a few dollars. He is a close observer of what goes on in the mine, a student of conditions and a hustler. He is well qualified to deal successfully with the problems that arise.

FOREMAN NOT ALWAYS TO BLAME

In considering the high standard of efficiency required of mine foremen, we are prone to forget that many of his acts are directed by his superiors in office, in opposition to his own best judgment. The foreman is often adjudged inefficient because of the delay in making improvements that are greatly needed when, in fact, if the material was at hand and he was permitted to follow the dictates of his practical judgment, the needed work would have been performed and the conditions improved. In such cases it is the man higher up that should be censured and not the foreman.

I was pleased with Letter No. 5, by Thomas Hogarth, in which he urges the telling of the plain truth in answer to the questions of the superintendent or general manager in regard to conditions existing in the mine. This can be done in such a manner as to testify to the efficiency of the foreman. As a rule neither of these officials makes frequent visits to the mine, and consequently knows little of what is needed underground, except by the reports of the foreman and his assistant. The manager's aim and desire is to increase the production while decreasing the cost of operation.

A PRACTICAL ILLUSTRATION

Several years ago an inside foreman persistently pointed out to the superintendent of a certain mine the unfavorable conditions that prevailed in sections of the mine. The foreman insisted that these dangerous conditions should be arrested at once as a precautionary measure of safety. The general manager, knowing nothing of those conditions existing in the mine, was pushing the superintendent for a greater output of coal and a reduction in the cost of operation. The superintendent, not having the courage to inform the general manager of affairs existing underground, postponed from day to day the work recommended by the foreman and urged as necessary for the safety of the

mine. The conditions grew gradually worse, and it is clear to every practical mining man that had this superintendent made plain to the general manager the necessity of making the changes needed, even though the work should curtail the output of coal, the disaster that occurred in that mine later would have been averted and lives would have been saved.

JOHN ROSE,
Dayton, Tenn. Former District Mine Inspector.

Gaining a Maximum Tonnage

Letter No. 1—In working out the problem of securing a maximum output of coal per ton per man, the coal-sheet on the tipple is a good starting point. For instance, note the check numbers of the loaders who put out less than the average number of cars on the preceding day. Then go into the mine and ascertain from each of these men the reason why he loaded less coal than the average the previous day.

By extending these inquiries in this manner over a period of several months and arranging the reasons given for loading less coal, it will be found that these can generally be classified under the following heads: (1) Cars come too slow. (2) Place not cut by machine. (3) Track not fixed in room. (4) Bad air and smoke. (5) Place working badly. (6) Quit on account of sickness.

SLOW DISTRIBUTION OF CARS

Delay in getting cars to the working face for loading may be owing to a number of different causes, such as poor roads, balky mules, incompetent drivers, a poorly arranged system of haulage, rooms widely scattered, motor troubles and derailment of cars. When everything is working properly underground, the delay may be owing to congestion on the sidetrack or at the shaft bottom because of a cessation of dumping at the tipple owing to lack of railroad cars.

Most of the causes mentioned can be eliminated by proper attention on the part of the mine foreman and his assistants, whose duty it is to see that the roads are in proper condition, that good rolling stock is mantained and that good mules, competent drivers and motormen are employed. If the work of the drivers is scattered over a considerable territory, this can generally be avoided by giving proper attention to the turning of rooms off the headings, in such a manner as to provide a sufficient number of places to keep a driver busy on one entry or pair of entries.

Where it is necessary to work the entries back on the retreating system, the first rooms can be turned and worked up a short distance, when the miners from these places are shifted ahead as quickly as the entries are advanced sufficiently to permit new rooms to be turned. In this manner, a sufficient number of rooms can always be kept working to keep one driver busy on a single entry or pair of entries. Special attention should always be given in the development of a mine to the consolidation of the work.

WORK OF THE DRIVERS

There is great need of systematizing the work of drivers in a mine. The driver works by the day, while the loader is paid by the ton or the number of cars loaded. As a result loaders generally finish their work and quit the mine before it is time for the drivers to leave. This gives the drivers a chance to clean up the coal and to distribute the empty cars in the rooms, ready for loading in the morning. It frequently happens, however, that there is a disposition on the part of drivers to leave this work to be done in the morning, which causes much delay in making a start the next day.

To insure a good day's run, there should be plenty of coal on the bottom or at the tipple ready for dumping when the whistle blows in the morning, and each miner should have his supply of empty cars at hand ready for loading when he enters the mine and proceeds to work. It will often be difficult for a foreman to enforce this system, inasmuch as he is busy on top getting things started and cannot enter the mine for an hour or more in the morning. He must therefore delegate this work to the boss driver or other assistant and hold him responsible for putting the coal on the bottom in time for hoisting each morning. As mine foreman I have made many trips through the workings after hours to satisfy myself that the drivers were doing their duty and that the empties were placed ready for loading in the morning.

WORK OF THE LOADERS

The loader generally has his little whims, which it is better perhaps to respect than to attempt to analyze for correction. He likes to start early and load his coal rapidly, and any delay in getting cars breaks the charm, and his work is then done in a half-hearted way, with the result that he quits early, determined to get a better start the next day.

Again, nothing is gained by overloading a driver by putting more men on his run in hopes of increasing the number of cars hauled. A foreman should know how many cars a good driver can haul on his run in a single shift, and this should limit the number of men that can work in his territory and give satisfaction all around. Overloading a driver's run will generally produce confusion and interfere seriously with the systematic hauling of the coal, and this in turn will affect and dissatisfy the loaders, who will cease to put out their regular supply of coal. What I have said about the charm under which the loader works may seem pure sentiment to many, but it is nevertheless the deep philosophy of the men who load the coal at the working face. Attend, therefore, to the placing of the first car in each room in the morning.

WORK OF CUTTING THE COAL

Where the coal is cut by machine, it is important that each miner should square up his place ready for the machine-runner. If this is not done, the loader is very apt to find his coal is not cut when he comes to work the next day. A machine-runner who cuts coal by the ton or car will give the most attention to those places that are properly squared up and ready for cutting. The best results are obtained when every loader understands the importance of being ready for the machine. Many loaders give this matter little or no attention. Instead of arranging their work accordingly, they will continue to load all their loose coal until the last car is loaded, before starting to square up in readiness for the machine.

WORK OF THE DAYMEN

Although contrary to the modern policy of division of labor, it will frequently be found of advantage to have

a crew of daymen available for any kind of work that may be required of them, from laying a track to driving a mule. It is possible for loaders to devote much of their spare time to cleaning up the track in their rooms and repairing it when necessary, which would be to their own advantage as it would facilitate the movement of the cars in and out of the rooms. By so doing, men can do much to increase their regular daily output of coal. A working place is not in good shape when it requires handling the coal two or three times before it can be loaded into the car, because the track does not reach the face of the room.

Again, in the operation of every mine there are good and bad places, and the mine foreman often finds it expedient to make allowances in the working of hard places. The best of judgment is required in doing this, in order to treat all men fairly and with equal justice. The bad places must be worked, and it is often better policy to pay a good miner something extra to work the place than to give it to a less experienced miner or the last man on the job. In my opinion it is a bad policy to put a newcomer into the worst place in the mine. These men should be given an even chance with the old loaders, in order to secure permanent recruits and maintain a good force of loaders that will be always available when conditions require.

There is a certain knack in shoveling coal, and it will be found worth while to employ an experienced man whose duty it will be to train green loaders and to show them how to handle a pick and to shovel coal. A good loader can handle a pick or shovel equally well in either hand. He knows how to use both his back and legs when shoveling, instead of doing all the work with his arms. Such a training as I mention here will develop a good class of loaders who will be able to mine and load more coal in a day than is possible without such training.

The course of training should include the location, drilling, charging and firing of shotholes so as to produce the best results. I have seen men who weigh not over 125 lb. load eight 2-ton cars of coal by 4 o'clock and be ready to do the same thing the next day. I have seen other men, husky fellows, who were hardly able to finish loading six cars because of their inexperience in the handling of pick and shovel.

Digging is an important part of the work of the loader. All cutting machines leave a bottom coal to be taken up, and no shot brings down all the coal. For this reason, the work must be squared up as the face is advanced, and made ready for a new cut with the machine. The loader must be trained and shown the best manner to perform all this work.

GEORGE STOCKDALE.

Mt. Braddock, Penn.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

The Year—A year is the period of time in which the earth completes one revolution in its orbit.

The **solar year** (365 d., 5 hr., 48 min., 45.51 sec.) marks a complete revolution about the sun.

The **sidereal year** (365 d., 6 hr., 9 min., 8.97 sec.) marks a complete revolution with respect to a fixed star.

CIRCULAR MEASURE

60 seconds	= 1 minute	
60 minutes	= 1 degree	3,600 seconds
15 degrees	= 1 hour angle	900 minutes
30 degrees	= 1 sign	1,800 minutes
12 signs	= 1 great circle or circumference	360 degrees

The **"sign"** is one of the twelve divisions of the zodiac, which correspond to the twelve calendar months of the year. The sign has no practical value technically.

It is often convenient to express the length of an arc, or the angle it subtends, in terms of the radius of the circle. In that case, the unit of length is called a "radian." A **radian** is a length of arc equal to the describing radius. Its value expressed in degrees is $180° \div \pi = 180/3.14159 = 57.2958$ deg., or 57° 17′ 44.88″. Since the length of the circumference of a circle is $2\pi r$, there are 2π radians in a circumference or 360 deg.

Circular measure is used in the measurement of angles and in the estimation of **latitude, longitude** and **solar** or **sun time,** which varies from **standard time** according to the location of the observer.

Measurement of Time—The passing of time is measured by the revolution of the earth on its axis, as determined by the observation of the sun or one of the fixed stars when crossing the meridian of a place. A single revolution of the earth marks a period of 24 hr. or one day.

Sun Time—Owing to the inclination of the earth's axis to the plane of its orbit and the eccentricity of the orbit, the sun's apparent motion in the celestial sphere is not wholly uniform, on which account **solar time** is referred to a "mean **sun**" having an assumed uniform motion.

Equation of Time—The difference between the mean sun and the true or observed sun, expressed in hours, minutes and seconds, is called the "equation of time." This is found for any date in the "Ephemeris" or Nautical Almanac.

Sidereal Time—The apparent movement of the fixed stars, unlike that of the sun, is uniform, which makes the sidereal day correspond precisely with one complete revolution of the earth on its axis. About Mar. 21, or at the vernal equinox, sidereal time agrees with mean sun or solar time.

Local Time—When the 24-hr. cycle is referred to the local meridian as zero (noon or midnight) the indicated hour is the local time, or the time for that place only. Since there are 360 deg. in a circle, which marks 1 day or 24 hr. of the celestial equator, 1 hr. corresponds to $360 \div 24 = 15$ deg. Hence, a difference of 15 deg. marks a difference of 1 hr. in local time.

The Coal Age Pocket Book

Longitude, Latitude—Longitude is the distance either east or west of the **meridian of Greenwich,** which is marked by the Royal Observatory, and measured in degrees, minutes and seconds, on the equator. There are thus 180 deg. of **east longitude** and 180 deg. of **west longitude.**

Latitude is likewise distance north or south of the equator, measured in degrees, minutes and seconds, on any meridian or great circle passing through the poles. There are thus 90 deg. of north latitude and 90 deg. of south latitude.

Standard Time—To obviate the confusion caused by the difference in local time, a system of "standard time" has been adopted. Starting from the meridian of Greenwich, standard time is 1 hr. later for each 15 deg. of east longitude, and 1 hr. earlier for each 15 deg. of west longitude. Calling the equatorial circumference of the earth 25,000 mi., a degree of longitude represents a distance on the equator of $25{,}000 \div 360 = 69.4$ mi. Hence, 1 hr. (15 deg.) corresponds to a distance of practically 1,000 mi. at the equator.

In the United States and Canada, there are four divisions of standard time, known as **Eastern, Central, Mountain** and **Pacific time,** which are exactly 1 hr. apart. These are all referred to the observatory at Greenwich, which marks the zero of longitude.

Eastern time is the solar time of the meridian 75 deg. west longitude, and is the standard time for all places within 7½ deg. on either side of that meridian. Eastern time is therefore $75 \div 15 = 5$ hr. earlier than Greenwich time.

Central time is solar time for the meridian 90 deg. west longitude, and is likewise standard for all places within 7½ deg. east or west of that meridian. Central time is 1 hr. earlier than Eastern time.

Mountain time is solar time for the meridian 105 deg. west longitude and standard for all places within 7½ deg. east or west of that meridian. Mountain time is 1 hr. earlier than central time.

Pacific time is solar time for the meridian 120 deg. west longitude and standard for all places within 7½ deg. east or west of that meridian. Pacific time is 1 hr. earlier than mountain time.

When it is noon at the observatory at Greenwich it is 7 a.m. at New York, 6 a.m. at Chicago, 5 a.m. at Denver and 4 a.m. at San Francisco. At the same time it is 1 p.m. at Berlin and Rome, 2 p.m. at Petrograd and 8 p.m. in the Philippines.

Civil Time—The day, for all common purposes of reckoning, begins and ends at midnight. The 24 hr. are divided into two periods of 12 hr. each. The hours from midnight to noon are designated by the letters a.m. (ante meridian), and those from noon to midnight by the letters p.m. (post meridian).

Astronomical Time—The astronomical day is reckoned from noon to noon, the hours being counted from 1 to 24. The astronomical day begins 12 hr. later than the civil day, as the following comparisons will show:

Civil time,	Nov. 6, 3 a.m.;	Nov. 6, 3 p.m.;	Nov. 7, 3 a.m.
Astronomical time,	Nov. 5, 15 hr.;	Nov. 6, 3 hr.;	Nov. 6, 15 hr.

Inquiries of General Interest

Flow of Water in Pipe Line

A horizontal pipe line having a diameter of 12 in. gradually reduces in cross-section to a diameter of 3 in., and then increases gradually to its original size. The water has a velocity of 5 ft. per sec. in the larger section of the pipe. I would like to ask, Neglecting friction, how does the pressure vary along the axis of this pipe? Also, does this reduction of sectional area affect the flow of the water in the pipe or reduce the quantity of water that will be discharged under the same head?

CONSTANT READER.

Mountain Park, Alberta, Canada.

Assuming a full flow of water in a pipe line under a constant head, a gradual reduction in the sectional area of the pipe, followed immediately by a gradual enlargement to the original area, will not materially affect the flow of water in the pipe. The velocity of the water at any point will vary inversely as the sectional area, or inversely as the square of the diameter at such point. In other words, the velocity ratio is always equal to the square of the inverse diameter ratio, which in this case is $(\frac{12}{3})^2 = 4^2 = 16$.

As shown in the accompanying figure, the velocity of the water at the throat, where the diameter of the pipe

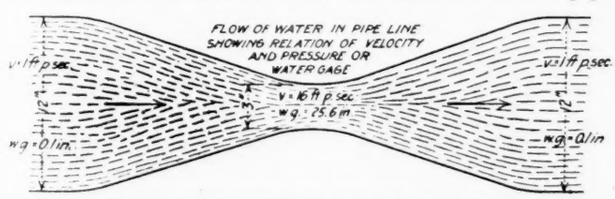


DIAGRAM ILLUSTRATING FLOW OF WATER IN PIPE

has been reduced to 3 in., is 16 times the velocity in the original section of the pipe.

But in the flow of a fluid through a conduit, the pressure at any given point varies as the square of the velocity of the flowing medium. Hence, ignoring friction, the pressure at the throat of the pipe in this case is $16^2 = 256$ times the pressure in the original section before the reduction of area took place. This is in accordance with the principle of the well-known Venturi meter. There is practically no loss of energy owing to the contraction of the vein, providing the decrease and increase are gradual. The pressure head being converted into velocity head and *vice versa*.

Pittsburgh Coal Prices in the Cleveland Market

I have sometimes wondered why your Cleveland market report quotes Youghiogheny, while Pittsburgh quotes the "Pittsburgh district." Pittsburgh district includes Youghiogheny, as well as Monongahela, nearly to Brownsville. Cleveland could quote the larger district, because it is made by the railroads with a uniform freight, except of course that Youghiogheny coal is different in quality from Monongahela. I admit this is true to an extent, but I doubt whether a definite price difference exists, except sometimes in slack coal. The physical difference is that the Youghiogheny runs more as a gas coal and the other more as steam coal. As the freights are the same, the mining rate the same and there is always more coal mined everywhere than needed, the market has hardly any opportunity to establish a difference in price.

Pittsburgh, Penn. B. E. V. L.

The reason that Youghiogheny is quoted in preference to Pittsburgh district is because Youghiogheny is the standard western Pennsylvania coal in the Cleveland district. Some Pennsylvania steam coal comes in over the Pennsylvania Pan Handle and is known locally as "Pan Handle" coal. There is a small trade for Youghiogheny, mine-run and slack. There is a little domestic trade and a good lake trade. Youghiogheny is the standard lake fuel.

Fairmont coal is better known and more extensively used there than Pennsylvania bituminous coals. When the market is down, the West Virginia operators will underbid the western Pennsylvania producers. In a low market there is a good deal of Youghiogheny slack sent there, and some Pan Handle. The latter usually sells at five to ten cents less than the gas coal and is treated on the same basis as No. 8, which it very closely resembles.

Motor Trouble

I have had considerable trouble in the operation of a mine motor and would like to ask if you can explain the difficulty and tell me how to remedy it. The motor appears to get too much power when the controller is on the first point, which causes it to burn out.

Homer City, Penn. J. M. CONRAD.

The trouble is probably due to the motor being "hooked up" improperly; that is to say, the connections in the wiring are wrong. This is easily remedied by anyone having sufficient intelligence to investigate the matter. If the system is not thoroughly understood, however, a diagram of the wiring can be obtained from the makers of the machine.

The fact is there is not sufficient resistance in the circuit when the controller is on the first point, and as a result too much current flows through the motor before the latter has picked up speed sufficient to generate the required amount of counter-electromotive force, which takes the place of the resistance after the motor has attained its full speed.

It is important to always protect the circuit by fuses, so that in case anything is wrong in the connections, it will not result in burning out the motor, which will be prevented by the melting of the fuse and the consequent breaking of the current.

Examination Questions

Miscellaneous Questions

(*Answered by Request*)

Ques.—Explain by means of a sketch the proper arrangement of a blowing fan and its connection with the downcast shaft, assuming the mine is generating gas and a possible explosion may destroy the fan.

Ans.—As shown in Fig. 1, the fan should be set back a suitable distance from the top of the shaft, which is surmounted by explosion doors opening upward and designed to relieve the pressure owing to the explosion and thus prevent the destruction of the fan. As shown in the figure, the fan wheel is surrounded by a spiral casing that expands regularly from a point a short distance from the cutoff *c*. From *c* to *b* the casing is concentric with the fan wheel, the expansion starting at *b*. The distance *cb* must not be less than the distance between two consecutive blade tips, in order to prevent the back-lash of air at this point.

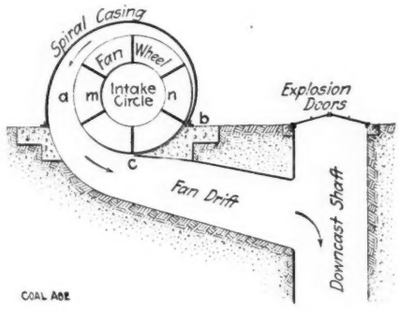


FIG. 1. SHOWING POSITION OF FAN

Atmospheric air enters the fan by the intake circle, and passing through the compartments between the blades, flows around the fan in the direction of rotation, as indicated by the arrows. The curve of the spiral casing is continued on the floor of the fan drift, which has a slight inclination toward the shaft. The center of the fan should be set back about 50 ft. from the shaft. The fan is partly sunk in a pit lined with concrete walls, which furnish a good foundation for the fan and the building or fan house.

Ques.—Are you in favor of the use of mixed lights in a mine where explosive gases are generated? Give full reasons.

Ans.—No. Where safety lamps are required to be used in certain portions of a mine generating gas, with a few possible exceptions where the two portions of the mine are widely separated, thereby affording ample protection against the gas finding its way from the section in which it is generated into the other section of the mine, the entire mine should be worked exclusively on safety lamps. The reason for this is the ever-present danger that in the operation of the mine an open light may find its way into the gaseous section of the mine; or the gas generated in that section may be forced back into the other section of the mine by reason of a local explosion in the first section, or by an unprecedented fall of roof in that section, or by the setting open of the division doors and the consequent disarrangement of the ventilation. Again, the fact that gas is generated in these measures makes it possible that gas may be generated in those parts of the mine where it has not previously appeared. This may occur at any time and perhaps because of a general subsidence of the roof formation or as a result of a squeeze or creep extending more or less throughout the mine. These reasons are sufficient to require the exclusive use of safety lamps in a mine any portion of which is generating gas in such quantities as to require their use in other parts of the mine.

Ques.—How often is it desirable that a boiler should be cleaned?

Ans.—The frequency of cleaning a boiler will depend upon the purity of the feed water used. It is important that boilers should be cleaned at regular intervals. In the great majority of cases, the cleaning of the boiler should not be delayed for a period longer than one week, and in many cases more frequent cleaning is necessary.

Ques.—What is a steam separator, and why is its use desirable?

Ans.—A steam separator is an arrangement or device for separating the entrained water from the steam before the latter is permitted to pass into the cylinder of the engine. The use of a separator provides comparatively dry steam and prevents the accumulation of water in the steam line and the cylinder. When water is permitted to accumulate in a steam cylinder, there is danger that the cylinder head may be knocked out by the movement of the piston to and fro in the cylinder, the water being incompressible.

Ques.—Describe the process of forepoling used in driving a heading under a tender roof in a mine.

Ans.—This system is shown in Fig. 2. The props *A, B* and *C* are set at regular intervals as the heading is advanced. In order to prevent the frail roof from falling between the timbers, flat spiles *a, b* and *c* are driven in consecutively over the last collar set next to the face of the coal. These spiles are formed of 2-in. planks 8 or 10 in. wide and sharpened at one end to facilitate their driving. The figure shows the manner in which the spiles are driven up in order as the face advances.

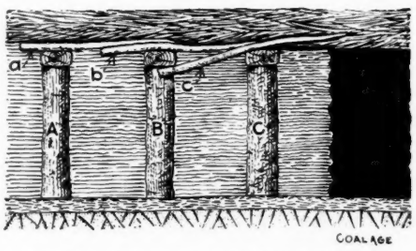


FIG. 2. METHOD OF FOREPOLING

Ques.—What is the chief thing to be remembered while wearing an apparatus?

Ans.—Your own safety and those that are with you. also, that men caught in a mine explosion or fire should not be considered as dead until life is found to be extinct. It is important to note constantly that the apparatus is working properly and that the supply of oxygen remaining is sufficient to enable you to make good your escape to the surface, making due allowance for unavoidable delays

Book Reviews

Book on Smokeless Combustion

COMBUSTION AND SMOKELESS FURNACES. By Joseph W. Hays. Pp. vii + 116 + 2 index; 6¼x9¼ in.; 21 illus. Second edition (revised). Joseph W. Hays, publisher, Rogers Park, Chicago. Cloth boards, $2.

Remembering a lively little book on a similar subject entitled "How to Build Up Furnace Efficiency" written by the same author and reviewed in the issue of "Coal Age" of Nov. 14, 1914, the reviewer expected much pleasure in the perusal of the volume about to be discussed. The book being reviewed makes more pretentions than the other, but is disappointing for one cannot but realize that Mr. Hays is at his best in the furnace room and not so much at home when he begins to discuss chemistry and thermodynamics as abstract sciences, as he endeavors to do in parts of the present volume.

The first of all his difficulties is his wrong conceptions about the "absolute zero." This point on the thermometric scale is purely an abstraction, about as dependable as the point on the chronometric scale once volubly pointed out by a conductor on a "tin lizzie" street car plying between St. Johns Place and Borough Hall in Brooklyn. The happy Teuton who presided over this pretentious vehicle was dancing round the post which serves to operate the doors and hold the nickels and was joyously proclaiming—this was in August a year ago—that in five days the Germans would be in Paris.

Now he had every reason to figure that given a continuance of the phenomena which were up to that time apparent the Germans would enter Paris in five days, but he overlooked some countervailing conditions, and only a few days afterward it looked as if in a month the Allies would enter Berlin, which indication also failed of realization.

ABSOLUTE ZERO ONLY AN ABSTRACTION

It is somewhat similar with the absolute zero. The phenomena around ordinary temperatures point unerringly to a certain conclusion, but when lower temperatures are reached, the countervailing conditions modify these phenomena considerably. It appears that at 0 deg. C. a gas shrinks 1 part in 273.7 for every decline of 1 deg. C. and that the denominator 273.7 should be increased by adding the scale temperature to obtain the contraction per degree Centigrade at any other normal temperature.

It is extremely easy to fall into the error of believing that as this is true for all perfect gases and for reasonably large ranges of temperature it is true to the limit so that a gas will be without volume whatever at —273.7 deg. C. As the gas has shrunk to nothingness it can have no molecular motion and hence no heat and the temperature attained has accordingly been termed the absolute zero. But no thinking man ever believes gas so retiring as to dissolve into nothingness, and no one ever had any right to proclaim this point an absolute zero; for if the gas ceased to exist, it could have no temperature, and if it continued to exist, there was nothing to prevent a belief in a still lower temperature. In fact, the so-called "absolute zero" has been reached within a few degrees since the concept was first put into writing, and there is no evidence at such low temperatures that the law of shrinkage holds good or that there are not profounder temperatures yet possible in both theory and practice.

But we are troubled to know what to say, for after all what does Joseph W. Hays really mean? On page 3 he says, "There is no point strictly speaking when heat ceases and cold begins," and on page 4, he declares that "at this point [that at which he suggests that motion is at an end] what we call cold ceases—it cannot get any colder—and heat has its origin or beginning. This point has been definitely fixed for scientific calculations. It is 273.7 deg. below the zero of Centigrade. It is known as the absolute, or true, zero of heat energy." So on page 3 he tells us that there is no point at which heat begins, and on page 4 assures us that there is such a point. Both statements cannot be correct. Which guess is the right one no one knows, but certainly —273.7 is not that limit. It is nothing but a convenient basis for figuring.

On page 7 of the book which is being reviewed is to be found the veriest piece of spreadeagle Americanism: "Many of the highest authorities in physics and many of the American schools have adopted the Rowland determination [of the mechanical equivalent of heat], while others adhere to the final figures given by Joule." There is nothing objectionable so far; but then follows: "The Joule unit is generally accepted in Great Britain, and it would accordingly seem consistent to follow the British standard or cease reckoning in 'British thermal units' and adopt a unit of our own. As the Rowland experiments were conducted at Baltimore, it would be easy for those who prefer the Rowland figure to substitute 'Baltimore' for 'British,' and thus, while not abandoning the abbreviation 'B.t.u.' make plain what they mean when referring to a thermal unit."

BALTIMORE THERMAL UNITS NOT NEEDED

A remarkable suggestion and one which would be worthy of some consideration if we were accustomed to conduct our calorimetric investigations by finding what work a pound of fuel would do and if we then determined by the Joule or the Rowland mechanical equivalent the number of thermal units generated. As a matter of fact we do no such thing. We take the coal, burn it and see what heat it develops, and if Joule and Rowland were 100 per cent. wrong in their determination, the number of thermal units credited to a pound of fuel would not be one more or one less. For your information, Mr. Hays, the word "British" applies to the pound and to the Fahrenheit degree and not to the mechanical equivalent of heat, the people of the United Kingdom and of this country also being unfortunately wedded to these undesirable units, though of course the latter monstrosity hailed from France. To their credit the French people knew enough to take up with a somewhat better unit introduced by a Swede.

After all, when we now use "British thermal unit" and "calorie," we rarely refer to the pound or the gram at all; for the water raised 1 deg. Fahrenheit or Centigrade, as the case may be, is usually figured in like units to those used to measure the fuel burned.

Perhaps it might be as well to replace the term "British thermal unit" by "Fahrenheit thermal ratio," for when we say that a coal gives 14,000 thermal units we mean that a unit by weight of that coal will raise 14,000 units by weight of water 1 deg. Fahrenheit. The unit of weight, whether ounce, pound or ton, is not considered. It is not a number of units which we have, but a factor; and when we want calories in place of British thermal units, we pay no attention to the relative size of the gram and pound, but divide by 1.8, the ratio of the units in the thermometric scale. So after all, "British" is a misnomer and "Baltimore" a still greater folly.

SUMMARY OF THE SUBJECTS TREATED

Having done what a censor of technical books should do before they are published, if he had the time to do it, it is necessary to say something about the book itself, which it must be confessed is far better than the extracts just quoted. It commences with "Heat and Combustion" and then discusses "Combustion and the Boiler Furnace." Very clearly Mr. Hays shows that the work of the furnace is separate from that of the boiler, and he treats the relation between combustion and its calorific effect in another chapter.

In the "Chimney Evil," he deals not with smoke so much as with the carbon monoxide which is in that smoke. The generation of this monoxide is a greater cause of the inefficiency of a furnace than is the generation of dense smoke, and the author suggests that the diffusion of the monoxide through the air may do more harm than fuliginous clouds of soot.

Then he discusses all the failings of different classes of furnaces, both mechanical and hand-fired, and none of them escapes scathing criticism. Be it understood, however, that he speaks always of types and not of specific makes, and being generalizations his descriptions of the methods of operation and application are sometimes not as clear as one might wish. The illustrations are the merest sketches, exhibiting boiler settings rather than grates.

Still the reader will find much sterling wisdom, for Mr. Hays is an extremely practical engineer with an original point of view and firm convictions. In the final appendix he discusses as a sort of afterthought flue-gas analysis, the effect of soot in preventing radiation of heat and the use of soot cleaners in water-tube boilers. Mr. Hays is never uninteresting; he is always practical, and his book cannot fail to be of great profit.

Coal and Coke News

Harrisburg, Penn.

The anthracite coal tax of 1913 was declared unconstitutional by the State Supreme Court on Oct. 28, and as a result the state will lose nearly $10,000,000 in taxes. The opinion, written by Justice Stewart, reverses the decision of Judge Kunkel, of the Dauphin County Court, rendered several months ago, the local jurist holding the act constitutional and valid.

The act, which levies a 2½ per cent. tax on anthracite coal mined, was operative for two years, or from July 1, 1913, to July 1, this year, when it was supplemented by the Dawson Act of 1915, which provides a similar tax, but provides that instead of dividing the tax among all the municipalities of the anthracite region, the tax shall be split 50-50, the state sharing with the municipalities that produce the fuel.

Coal companies from the start opposed the imposition of the tax and hundreds of appeals from the settlements of Auditor-General Powell were filed in the Dauphin County Court. The conclusion reached by Judge Kunkel, however, was based on the case of the Alden Coal Co. involving the collection of $7,792.76, due for the six-months period from July 1 to Dec. 31, 1913.

Judge Kunkel in his opinion held that the act was crudely drawn in that there was no express requirements that the operator shall pay the tax.

Only $20,000 has been paid into the state treasury by the anthracite coal companies under the act, and all of this under protest. This money will probably be returned by a special act of the next legislature, but there is no possibility that the $9,000,000 or more collected by the coal companies can be paid back to the consumers. It is said on an average of 10 to 15 cents a ton was charged by the operators to cover the amount of the tax. Under the coal tax act of 1915, the collection of the tax under the act of 1913, expired July 1, this year, so that the excess charges of the coal operators covered a period of two years.

Justice Stewart's opinion was not unanimous, for Justices Porter and Frazer dissented. In reversing the Dauphin County Court, Justice Stewart said in part:

"When the necessary effect of the legislation is to create inequality of burdens as we here see it, are those complaining of the injustice to receive no other answer than that while the constitution promises them equality in the matter of taxation, that because it failed to place restriction upon the legislature's right to distribute the tax it collects, that therefore the purpose of the legislation is not to be inquired into? If constitutional requirements are to be circumvented by such simple and easy process of reasoning, the question may yet be asked derisively of the constitution, 'What is all this worth?' "

Just what effect the decision will have on the 1915 act is not known, although it is said that the latter may be declared unconstitutional.

So far no settlements under the 1915 law have been made, but many of the coal companies have protested against the provisions of the new act requiring statements of coal mined.

As soon as it is settled that no appeal will be taken by the state, some companies will make an effort to return to the consumers the tax collected under the 1913 act, but if the state attempts to collect the tax under escheat proceedings no tax money will be returned at present.

Jersey Central Must Sell Lehigh & Wilkes-Barre

The United States District Court on Oct. 28 decreed that the ownership of the Lehigh & Wilkes-Barre Coal Co. by the Central R.R. of New Jersey is a combination in restraint of trade and that the Central company must dispose of its interest in that concern.

The decree filed by the court is on the decision of the court last June in the government's anti-trust suit against the Reading company, Jersey Central and others. The court at that time suggested that the Lehigh & Wilkes-Barre company be divorced from the Jersey Central.

As the subject of this separation was not argued when the case was heard, the court in its decision last June suggested it for consideration of counsel when the scope of the decree came to be determined. There was a difference of opinion as to in what form the decree should be and the court on the above date decided that the union of the Philadelphia & Reading Coal & Iron Co. and the Lehigh & Wilkes-Barre Coal Co. through the instrumentality of the Reading company is a combination in restraint of trade and violates the anti-trust act of 1890.

The Reading company, a holding corporation, owns all the stock of the coal and iron company and a majority of the stock of the Jersey Central, the last named in turn owning a majority of the stock of the Lehigh & Wilkes-Barre Coal Co.

The court decreed that after 90 days from date the defendants must submit a plan for the disposal by the Jersey Central of all the stock and other securities of the Lehigh & Wilkes-Barre Coal Co. now owned by it unless an appeal is taken to the United States Supreme Court. If the defendants fail to present a plan the court will take such further steps by receivership or otherwise as may then seem necessary.

Pending the disposal of the Lehigh & Wilkes-Barre Coal Co.'s stock, the Jersey Central, the Reading Co. and all other corporations controlling any stock are enjoined from voting it.

PENNSYLVANIA

Anthracite

Weatherly—The Lehigh Valley Coal Co. has commenced work on the construction on a drainage tunnel in an effort to clear its workings of water at Buck Mountain.

Williamstown—The forestry services of the Pennsylvania R.R., the Philadelphia & Reading Coal & Iron Co., the Lehigh Valley Coal Co. and the Susquehanna Coal Co. were represented at the meeting of the timber owners of Dauphin County on Oct. 26, and organization of the Susquehanna Forest Fire Protective Association was completed. The forestry protective department of the Pennsylvania R.R. includes about 10,000 acres of woodland; the Philadelphia & Reading Coal & Iron Co. preserves comprise about 15,000 acres and the Susquehanna Coal Co. timber holdings cover some 5,000 to 10,000 acres.

Tamaqua—After an idleness of 8 days the 600 employees of the Maryd Coal Co., at Maryd colliery near here have resumed work. The trouble originated over the handling of grievances by the mine committee of the mine workers. Three "locals" are formed by the men at this colliery and of this number the Maryd local claimed the larger percentage of employees and appointed the mine committee. This committee, it was claimed by the other two locals, would not handle their troubles, when asked again and again, and when the two locals composed of the other employees endeavored to have the committee replaced by one of their selection, they were met with a refusal by the company officials, who claimed that but one mine committee was all they were compelled to deal with. The company officials found that the dissenting locals had the majority of employees enrolled and they at once met the new committee. Upon the acceptance of the committee the men decided to return to work pending an adjustment of their trouble.

Shamokin—As the result of an explosion of a boiler, the fan and boilerhouse of the Susquehanna Coal Co., at Shamokin, was completely destroyed recently, causing a loss to the property amounting to $2,500. Charles Schlegle, a fireman in the employ of the company, was probably fatally injured.

Bituminous

Robertsdale—The Rockhill Iron & Coal Co. is installing a 500-kw. Kerr mixed pressure turbo-generator at the Woodvale plant, where a fireproof boiler- and power-house is under construction. Hoffman Bros. of Punxsutawney, have had two diamond drills at work on the company's property for almost two years and contract for two new slopes has recently been awarded to the S. J. Harry Co. of Connellsville. The East Broad Top R.R., over which this coal is shipped, is erecting a new transfer plant at Mt. Union equipped with conveyors, picking tables, etc., to handle an increased output.

Indiana—One of the worst car famines ever experienced by the coal operators of this part of the state has struck the Somerset and Indiana County coal fields, just at a time when the coal business was beginning to boom. It is stated by the

operators dependent on the Baltimore & Ohio and Western Maryland railroads for shipping facilities from the Somerset County field that the car shortage last week amounted to about 30 per cent. In Indiana County it is stated that the shortage is leading to a curtailment of output, the mines working only part time, whereas they might be working full time on the orders now received. In Somerset County some of the coal is being stored in the hope that the car famine will soon be relieved.

Connellsville—The shipments of coke from the Connellsville region recently amounted to 437,000 tons per week while production only reached 428,000 tons. The region as a whole is operating at approximately 80 per cent. of its total oven capacity. The Connellsville coke operators are scouring the country for men to operate the idle ovens.

Work has been started in cleaning up the Gaylord mine of the Pittsburgh & Cleveland Coal Co.

Adamsburgh—The Edna No. 1 Mine of the Pittsburgh & Baltimore Coal Co. will shortly resume operations after an idleness of a year. It is reported that the company has several large orders booked which will mean steady employment for about 250 men.

VIRGINIA

Toms Creek—The Virginia Iron, Coal and Coke Co. has placed 550 ovens in blast at this place, and it is reported that others will be placed in operation at Inman and other localities in Wise County field. It is said that this activity is largely the result of preparations for blowing in the Max Meadows and other iron furnaces in southwest Virginia.

WEST VIRGINIA

Charleston—According to the statement of Earl A. Henry, chief of the Department of Mines, the operations of the United States Coal and Coke Co. in McDowell County have established a remarkable casualty record. It is believed that this is the best record ever made in West Virginia and it is said that it has never been equalled in the United States in the same character of mines. Employing 1,667 men, of whom 1,095 were foreigners, and producing approximately 1,618,490 tons of coal, only one man was lost through fatal accident in the fiscal year ending June 30. During the same period of time, 455 fatal accidents occurred in the entire state, the tonnage per fatality being 140,856 tons.

Huntington—All previous coal loading records on the Chesapeake & Ohio R.R. for a single day were recently surpassed when 2,875 cars were loaded with 145,300 tons. The nearest previous record was on Oct. 18, when 2,559 cars were loaded with 119,235 tons. It is expected that the loadings for October will exceed those for September which up to that time was the best month in the road's history.

Belington—The coal mines in Tygart Valley are showing great improvement. Plenty of work is in sight, and the miners who have been on the "watchful waiting" list are now selecting places. The Davis Colliery Co. has started to open the Junior mines which have been closed for some months. Preparations are under way at the Meriden mine for a large tonnage. Century, Lillian, Arden and Gage are working daily while Dartmoor and Weaver are working better than for many months. Other small mines are running to capacity and it is believed that by Dec. 1 all the mines and ovens in the territory will be in full operation.

KENTUCKY

Hartford—Neighbor Bros. have opened a 6-ft. vein of fine coal on the Taylor lands, near Beaver Dam, Ky., and are retailing lump and nut coal from the workings.

Bevier—The tipple at the mine of the Crescent Coal Co. was destroyed in a recent fire. Several weeks will be required in reconstructing this part of the plant.

Whitesburg—In order to fill the increased orders for coal from the fields around Fleming, McRoberts, Jenkins, Dunham and Haymond, several hundred men have been put to work in the mines during the past few days. It is said that the plant of the Elk Horn Mining Corporation of Fleming and Beaver Creek will about double its present output during the next three weeks, besides starting up the mines in Hemphill which have been standing idle for nearly 12 months. Practically the same conditions prevail in all the other fields of eastern Kentucky.

Haymond—In drilling for water near this town a rich flow of natural gas was discovered at a depth of a little less than 150 ft. It is generally believed that the Pottersfork section is rich in gas and will soon become a producing territory. It is said that a company will be immediately organized for the development of the property on a large scale. It is also believed that oil exists in this territory.

OHIO

Martin's Ferry—It is reported that all the idle mines in this section would, if operating, employ only about 2,000 men. This means that only the small mines are idle and that the coming of winter finds the men either employed at other mines or in other occupations. With two or three exceptions it is said that all the big mines in the entire field are working.

Bellaire—The Schick Coal Mine shut down recently by a strike has resumed work. The old check weighman complained of by the miners was put back to digging coal. The miners complained of the check weighman and elected a new one. When this man reported for work the company refused to recognize him and the miners struck. The strike was settled at a conference of the sub-district officials and mine owners.

Fairpoint—With approximately 100 miners employed the Fairpoint Coal Co. has resumed operation for the first time since the eastern Ohio coal strike was declared. It is said that conditions in the eastern Ohio coal field look much better than a month ago, and it is believed that a steady return to normal business will follow.

Athens—That officials of the Sunday Creek Co. believe there will be an adjustment of freight rates and the wage scale with the miners in the near future is indicated by the heavy expenditures made by the company. Tipples have been rebuilt at three mines already, and it is reported that new equipment for 10 of the 23 mines of the company in southeastern Ohio has been ordered.

Lathrop—Preparations are under way for the resumption of work at the mines of the Black Diamond Coal Co., at Lathrop, which have been closed since June 1. A force of men is engaged in cleaning up the mine, and 200 miners will be placed at work at once.

ILLINOIS

Belleville—R. W. Ropiequet, attorney of the St. Louis Coal Traffic Bureau, delivered an address recently to the Belleville Commercial Club on "The Railroad Situation and How It Affects Belleville." He spoke particularly about how Belleville's coal interests are affected by the railroad situation.

Hillsboro—State's Attorney Major has consented to drop the prosecutions begun recently against the pit committee of the local miners' union, charged with interfering with the employment of five miners who were members of the state militia. The state officials of the United Mine Workers of America have agreed to reinstate the militiamen, who had been suspended. They are to be permitted to remain in both the militia and the union and are to be compensated by the union for the time lost while they were under suspension.

COLORADO

Denver—The Bear River Coal Co., George N. Sparling, president, 732 Gas & Electric Building, Denver, who in July, 1914, filed on 160 acres of Government coal land in Routt County, Colo., and opened a mine at that time and has since been driving entries under the ruling that only development work could be done till the land was appraised and paid for, has succeeded in having this done and is now going ahead pushing the production of coal. The mine is located at Bear River. Shaker screens are being installed. The coal is 10 ft. thick.

WASHINGTON

Seattle—Suit to foreclose a mortgage of $250,000 on the properties of the Issaquah & Superior Coal Mining Co. has been started by a local bank which holds the mortgage. The bank bought the notes and mortgage last July at a sale held by the U. S. Marshal.

Auburn—It is reported that after several weeks of prospecting, J. G. Evans has found a rich bed of coal three miles northeast of Auburn. The coal bed is apparently 6 ft. or more in thickness and covers an unknown area. The coal is said to compare favorably with the best from the Black Diamond mines.

Chesaw—A bed of bituminous coal between 3 and 4 ft. thick has been encountered 7 mi. west of Molson by well drillers. The depth of the coal bed is approximately 90 ft.

FOREIGN NEWS

Copenhagen, Denmark—The Danish Government is taking steps to mine coal upon a commercial scale in Greenland. This is due to the fact that it is now difficult to buy English

coal in Denmark, the coal famine being so serious that the government is planning to relieve the situation in part by cutting wood from the government forests. Coal has heretofore been mined in Greenland only in an experimental way, but the deposits in the opinion of experts are quite extensive. The heating quality of the fuel is, however, not regarded as equal to that of English coal.

PERSONALS

Van H. Manning will address a meeting at the Carnegie Institute of Technology at Pittsburgh, Penn., on Monday evening, Nov. 8.

F. W. Whiteside, of the Victor American Fuel Co. of Denver, Colo., has gone to California via New Mexico on a combination pleasure and business trip.

J. Ray Quinn for the past 6 years in the employ of the Central Fairmont Coal Co., recently resigned and accepted a position as manager of the Gano-Moore Coal Co., in Philadelphia, Penn.

F. J. Durdan, general sales agent of the B. S. Hamill Fuel Co., has severed that connection and will hereafter continue in the bituminous jobbing trade in Buffalo, N. Y., under his own name.

Hugh Gaffney, of Bridgeport, Ohio, formerly Deputy State Mine Inspector, has accepted a position as superintendent of Providence mine No. 1, of the Providence Coal Co., north of St. Clairsville.

F. L. Fenstemacher, assistant manager of sales for the Oliphant-Wasson Coal Co. will be in charge of a new office the company has opened in the Traction Terminal Building at Indianapolis, Ind.

D. A. Thomas, the Welsh coal operator, who is in America looking after ammunition shipments for the English government, has returned to New York from Canada. He is at the Plaza Hotel and expects to remain here for a few weeks.

D. D. Dodge, superintendent of the Carbon Coal and Coke Co., Cokedale, Colo., has gone to the coal fields of Pennsylvania to make an exhaustive study of the longwall conveyor in order to determine its adaptability to the Cokedale mines.

James R. Wooldridge, president of the Southern Appalachian Coal Operators' Association, has appointed a committee to look into the possibilities in the way of export business, seeking to land some of the large export orders for the mines of eastern Kentucky.

O. Tibbett, for many years superintendent of the Davis Coal and Coke Co., has tendered his resignation, and will retire from active mining operations. Mr. Tibbett takes this step on account of his advancing years, rendering the position which he has held for some time too arduous and exacting.

W. E. Hackett, of Spiro, Ark., recently resigned as mining engineer and assistant superintendent of the Bache-Denman coal properties, in Arkansas and Oklahoma, which are in the hands of a receiver and closed down, and is taking a trip through the Alabama, Tennessee and Kentucky coal fields.

J. M. Webb, in charge of first aid and rescue work instruction of the United States Bureau of Mines in Tennessee, southeastern Kentucky, and southwestern Virginia and West Virginia, with headquarters in Knoxville, Tenn., but who has for some time been residing at Birmingham, Ala., has moved his residence and family to 1907 Yale Ave., Knoxville. His office is at 232 Post Office Building.

Neil Robinson, of LaFollette, Tenn., receiver of the LaFollette Coal, Iron and Ry. Co. and the LaFollette Iron Co. returned recently from Boston, Mass., where he has been on business connected with these companies. The stock and bonds of these companies is held largely in Boston, and a movement is on foot by the Boston interests to reorganize these companies, together with the Co-operative Store Co., the commissary end of the LaFollette enterprises, into one company, with Mr. Robinson as president. It is expected that this deal will be consummated by the first of the year.

Edward J. Berwind, president of the Berwind-White Coal Mining Co., No. 1 Broadway, New York City, is one of the members of the newly formed Delectable Society of the Dotards of 1848, an even dozen of men born in 1848 who have achieved distinction either in commerce, finance or a profession. Each member holds an office in the organization. Mr. Berwind is described as follows in the roster of membership as it appears in the Dotards constitution: "Edward J. Berwind, official miner of the club; born June 17, 1848; president of the Berwind-White Coal Mining Co. and prominent in many large enterprises."

OBITUARY

Roswell G. Feltus, former general shipping agent, of the Philadelphia & Reading Coal and Iron Co., died suddenly in Philadelphia recently. Mr. Feltus was 75 years of age, was a veteran of the Civil War, in which he attained the rank of captain. He was also a member of many clubs and prominent in the affairs of the Episcopal Church.

Jacob P. Bauer, 69 years old, who was known to every river and coal man between Pittsburgh and New Orleans, died recently at his home, 3295 Montana Ave., Westwood, Ohio, after a short illness. He was for 40 years general manager of the W. H. Brown's Sons Coal Co., and after that concern was taken over by the Monongahela River Consolidated Coal and Coke Co. he was for 10 years local manager for that company. He retired about three years ago.

John J. Monaghan, 65 years old, a former district superintendent for the Philadelphia & Reading Coal and Iron Co., died on Oct. 24. He was born in England in 1850. At an early age he started to work in the mines and gradually rose from door boy to superintendent. He was retired about a year ago. He was a director of the First National Bank and president of the Shenandoah Building and Loan Association. A widow, four sons, all doctors of medicine and leading practitioners, and four daughters survive him.

RECENT COAL AND COKE PATENTS

Mining Machine. E. O'Toole. Gary, W. Va. 1,151,383 Aug. 24, 1915. Filed June 11, 1907. Serial No. 378,378.

Furnace. W. J. A. Muirhead, Seattle, Wash. 1,154,717 Sept. 28, 1915. Filed Oct. 22, 1914. Serial No. 867,981.

Coke Oven Door. E. C. Auld, Scottdale, Penn. 1,151,331 Aug. 24, 1915. Filed Apr. 3, 1914. Serial No. 829,323.

Mining Machine. B. Viviani, Monessen, Penn. 1,154,459 Sept. 21, 1915. Filed June 23, 1914. Serial No. 846,849.

Chimney Draft Device. E. Prat, Paris, France. 1,151,611 Aug. 31, 1915. Filed Aug. 29, 1913. Serial No. 787,315.

Mechanical Stoker. J. Van Vleck, New York, N. Y. 1,151,138 Aug. 24, 1915. Filed Feb. 20, 1915. Serial No. 9482.

Mine-Car Brake. C. E. Morgan, Holdenville, Okla. 1,154,041 Sept. 21, 1915. Filed June 24, 1915. Serial No. 36,097.

Rocking Grate Bar. C. R. Waid, Birmingham, Ala. 1,151,746 Aug. 31, 1915. Filed May 25, 1914. Serial No. 840,851.

Separation of Coal. F. W. C. Schniewind, Englewood, N. J. 1,152,442 Sept. 7, 1915. Filed Jan. 30, 1913. Serial No. 743,185.

Smoke-Consuming Furnace. C. H. Moore, Bellwood, Penn. 1,154,877 Sept. 28, 1915. Filed Feb. 26, 1915. Serial No. 10,706.

Brick Arch for Boiler Furnaces. C. F. Street, New York, N. Y. 1,153,648 Sept. 14, 1915. Filed May 22. 1915. Serial No. 29,873.

Purification of Coal. F. W. C. Schniewind, Englewood, N. J. 1,153,182 Sept. 7, 1915. Filed Dec. 19, 1912. Secial No. 737,689.

Fine Coal and Ore Separator. J. M. Draper, Manchester, England. 1,151,448 Aug. 24, 1915. Filed Apr. 4, 1914. Serial No. 829,581.

Miner's Safety Lamp. M. Albrecht, Frankfort-on-Main, Germany. 1,153,003 Sept. 7, 1915. Filed Nov. 24, 1913. Serial No. 802,819.

Downdraft Smoke-Consuming Boiler Furnace. C. H. Hook, Pittsburgh, Penn. 1,151,592 Aug. 31, 1915. Filed Feb. 3, 1915. Serial No. 5838.

Machine for Leveling Coal in Bee Hive Coke Ovens. J. H. Huhn, Fairmont, W. Va. 1,155,066 Sept. 28, 1915. Filed Mar. 5, 1910. Serial No. 547,441.

Apparatus for Electrically Igniting Miners' Safety Lamps. V. E. Joyce, London, Eng. 1,154,992 Sept. 28, 1915. Filed July 24, 1914. Serial No. 852,948.

Gas Producer. E. A. W. Jeffries, assignor to Morgan Construction Co., Worcester, Mass. 1,153,623 Sept. 14, 1915. Filed Apr. 1, 1909. Serial No. 487,355.

Coal-Mining Machine. C. C. Hansen, Assignor to Ingersoll-Rand Co., Jersey City, N. J. 1,154,922 Sept. 28, 1915. Filed Dec. 12, 1912. Serial No. 736,253.

Automatic Stoking Mechanism. D. T. Williams, assignor to Standard Stoker Co., Wilmington, Del. 1,152,682 Sept. 7, 1915. Filed Dec. 6, 1913. Serial No. 805,021.

Mechanism for Preparing Pulverulent Materials for Molding or Briquetting. E. B. A. Zwoyer and R. A. Zwoyer. 1,152,469 Sept. 7, 1915. Filed Oct. 26, 1908. Serial No. 459,577.

Mine-Car Wheel. W. D. Hockensmith, assignor to Hockensmith Wheel and Mine Car Co., Penn Station, Penn. 1,154,990 Sept. 28, 1915. Filed Mar. 6, 1915. Serial No. 12,562.

Machine for Making Briquettes. E. B. A. Zwoyer and R. A. Zwoyer, assignors to Zwoyer Fuel Co., a corporation of New Jersey. 1,152,468 Sept. 7, 1915. Filed Oct. 26, 1908. Serial No. 459,576.

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Department of the Interior, U. S. Geological Survey, Bulletin 587. "Geology and Mineral Resources of Kenai Peninsula, Alaska," by G. C. Martin, B. L. Johnson and U. S. Grant. Illustrated, 243 pp. with insert, 6x9 in.

INDUSTRIAL NEWS

Alton, Ill.—E. H. Smiley has been appointed at Belleville, Ill., as receiver for the Joseph Taylor Coal Co., of Alton.

Penn Station, Penn.—The Hockensmith Wheel and Mine Car Co. is now operating an addition to its plant and doubling its shop capacity.

Altoona, Penn.—Shipments of coke over the Pennsylvania R.R. lines in September amounted to 1,152,668 tons. For nine months coke carryings have aggregated 8,378,576 tons, an increase of 816,718 tons or 10.8%.

Washington, D. C.—The State Department is asking American railroads to cut off supplies of fuel to the enemies of the de facto government in Mexico as a supplementary proceeding to the embargo on arms and ammunition.

Cincinnati, Ohio—The Roberts & Schaeffer Co., of Chicago, recently closed a contract with the Campbells Creek Coal Co. for a 200-ton per hour Marcus patent picking table screen equipment for immediate installation in Putney, W. Va.

Wheeling, W. Va.—A freight car shortage is menacing the mining industry in eastern Ohio. Because of their inability to secure sufficient freight cars to handle the output, many operators have been forced to lay off miners or to work their mines only part time.

Summerville, Penn.—The Pennsy Coal Co. recently awarded a contract to the Roberts & Schaeffer Co. for a three-track frame constructed Marcus patent coal tipple with mechanical equipment for installation at Summerville. The aggregate cost of this structure will be $19,500.

Philadelphia, Penn.—The Federal District Court recently decided that the ownership of the Lehigh & Wilkes-Barre Coal Co., by the Central R.R. Co. of New Jersey was a combination in restraint of trade, and that the railroad must dispose of its interest in the coal company.

Richmond, Va.—The Norfolk & Western Ry. has placed orders for steel for the construction of 1,000 all steel coal cars, which are to be of the latest gondola type now in use on the road. The capacity of the cars will be 100 tons each, and they will be of the double-truck, 12-wheel type.

Philadelphia, Penn.—The Philadelphia & Reading Ry. has just let a contract to the Palmer Shipyard Co., Noank, Conn., for the construction of a number of coal barges to be used in the extensive Philadelphia-New England tidewater coal trade, in which the company already has a large fleet.

Helena, Mont.—The Montana Railroad Commission has ordered a reduction in rates on slack coal from the Bear Creek fields to points on the Northern Pacific R.R. The reduction to stations under 75 mi. is 10c.; between 75 and 125 mi., 15c.; between 125 and 250 mi., 20c., and to all points in Montana over 250 mi., 25c.

Indianapolis, Ind.—The Oliphant-Wasson Coal Co., which has just recently completed the equipment of a large and complete mine, announces the opening of an office in the Traction Terminal Building, at this place. The company specializes on "Old Vincennes" coal which is mined at Bruceville in Knox County.

Charleston, W. Va.—Alleging that the company is unable to operate its mines at a profit and meet outstanding obligations, W. Bernard Duke recently filed a bill in equity in the Federal Court against the Davy-Pocahontas Coal Co. He asked that a receiver be appointed. This firm operates practically entirely in McDowell County, W. Va.

Buffalo, N. Y.—The rebuilding of the lake trestle of the Delaware, Lackawanna & Western Co., now in progress by government order, to facilitate widening the mouth of Buffalo River, will make it necessary to remove the trestle about the middle of November. A car dump will be put in to replace the trestle and probably a box-car unloader.

Whitesburg, Ky.—Many coke ovens have been fired within the past few days in Wise County, Va., immediately beyond the Kentucky line. Most of these have been idle for several years. As a result thousands of new men have been added to the working force. The ovens are divided among the plants at Stonega, Osaka, Roda, Blackwood, Dorchester and Glamorgan.

St. Louis, Mo.—The Sullivan Machinery Co., of Chicago, announces the removal of its St. Louis branch sales office from 705 Olive St. to Suite 2006, Railway Exchange Bldg., where larger and more desirable quarters have been secured. This change will enable the company to give better attention to the requirements of its customers in the territory served by the St. Louis office.

Fairmont, W. Va.—The Baltimore & Ohio R.R. is preparing to place an order for 1,000 additional coal hoppers. The Western Maryland R.R. recently placed an order for 2,000 coal cars, while the Baltimore & Ohio a short time ago placed an order for 2,000 coal cars. This makes the total number of cars purchased by the two roads 5,000. Most of these cars will be used in the upper Monongahela Valley.

Fairmont, W. Va.—One of the largest industrial deals which has taken place here in many years was recently consummated when the Monongahela Valley Traction Co. took over the holdings of the Fairmont Gas Co. The capitalization of the traction company is to be increased from $7,500,000 to $12,500,000, with an authorized preferred capital stock of $3,000,000, while common stock will amount to $9,500,000.

Bristol, Tenn.—Following the general revival of the steel, iron and kindred industries, practically all of the coke ovens in southwest Virginia, many of which have been idle, have resumed operation, or will resume operation shortly. Active preparations are being made to put several furnaces and steel mills into operation, and it is expected that within the next 30 days industries in this section will be more active than at any time since 1907.

Bloomsburg, Penn.—The Supreme Court having ruled Keran Donahue off the ticket as a candidate for mine inspector because this office cannot be voted for in an odd numbered year, his attorney has now taken the position that James O'Donnell, present holder of the office, was illegally elected in 1911. The attorney has filed a petition with the court asking that the office be declared vacant, and that Mr. Donahue, who defeated Mr. O'Donnell for the nomination at the recent primary, be appointed to the office.

Jenkins, Ky.—A total of 300,000 acres of timber land in eastern Kentucky and 100,000 acres of which is the property of the Consolidation Coal Co., has been pledged to the Eastern Kentucky Forest Protective Association. This timber is in the Elkhorn and Boone's Fork sections and the first lookout station has been established in the heart of the Cumberland Mountains contiguous to the Virginia border line. It is connected by telephone with the local exchange. Other stations are projected. Twelve counties in eastern Kentucky have organized for fire protection.

Columbus, Ohio—The New Pittsburgh Coal Co., the only Hocking Valley operator that has shipped Lake coal this season to its docks, is finding the last stage of the navigation period a very lively one. Its mines are all running full time, and it has more orders from the Northwest than it will be able to take care of before boats go out of commission. Sales Manager Rundio is of the opinion that, weather permitting, the season will be greatly extended this year, because of the strong demand that has set in from the upper docks.

Coal Trade Reviews

General Review

Anthracite buying slowed up by mild weather but market has not lost ground. Heavy movement on bituminous contracts. Scarcity of vessels causes accumulations at Tidewater. Lake movement increasing. Middle Western mines on heavy working schedules.

Anthracite—The volume of coal moving has greatly increased and definite steps have been taken toward advancing quotations. The slowing up in orders occasioned by temporary mild weather have been offset by increased stocking operations among dealers who are becoming anxious over the outlook. An unusual succession of holidays in the mining regions has interfered with operations at a rather critical time. Poor car supply and slow movement on the roads continues to be the source of much anxiety. Demand at the more remote points, where shipments are difficult to obtain, is particularly strong. Full circular prices rule.

Bituminous—There is active canvassing for contracts and concessions are still obtainable for delivery before Jan. 1, but the circular is firm on business to Apr. 1. Shippers are backward about admitting any particularly heavy business, though it is obvious that most of them have more orders on hand than can be filled, while the railroads uniformly report an exceptionally heavy movement. Manufacturing interests, with storage facilities, are accumulating surpluses against possible difficulties later. Some of the better grade coals have been withdrawn from the market. The increased movement is confined largely to requisitions on contracts, and there is considerable coal arriving at the distributing centers. Restricted car supply is still interfering with mining operations.

Exports—A considerable volume of coal is accumulating at tidewater points because of the slow movement of vessels. Bunker demand continues strong and is the only active department of the off-shore business. Very few steamers are available for export trade, and these are difficult to obtain even at the unprecedented freights offered. However, foreign inquiries continue numerous, and this in spite of the fact that it is gradually developing that the British embargo against export shipments declared some months ago has been practically abandoned.

Lake Markets—While fundamental conditions are growing steadily better, iron and steel mills pushing for maximum tonnage, and cold weather now at hand, the trade is on the other hand, facing the release of the heavy production now going into the Lake markets. As a rule, the entire output is going into immediate consumption with the possible exception of some stocking on the part of the railroads, and other consumers will have to take this up shortly in order to provide against possible contingencies next April. It is becoming more obvious all the time that the transportation companies are not prepared for the heavy increased traffic and car supply continues a constant menace to the trade. Considerable negotiations are noted on contracts expiring between now and the first of the year. A large number of cars sent into the Northwest with coal earlier in the season have not been returned, which is accentuating the difficulty in this respect.

Middle Western—There is considerable pressure for coal on contracts although the mild weather has resulted in the trade being rather inactive at the moment. However, the lull in orders has given some of the agencies a welcome opportunity to catch up on their business, and there is a well-defined tendency among manufacturers to accumulate stocks of steam coal, while prices on all grades are holding steady all along the line. Mines are working on the highest operating schedules for a long time. The railroads have not fallen seriously behind on the movement so far, but it has been such a distinct effort to keep up that there is general anxiety concerning this phase of the question. Northwestern railroads are buying heavier and there is considerable coal moving to their storage plants from the upper Lake docks. Lake shipments are showing a steady increase with the approaching close of navigation.

A Year Ago—Anthracite production heavy last month but market is still dragging. Spot demand for bituminous has entirely disappeared and heavy concessions are the rule. Lake trade still further curtailed but Middle Western situation improves.

BUSINESS OPINIONS

Iron Age—Never has the steel trade seen demand so overwhelming as at present, and, at the same time, output expanding on such a scale, under steadily advancing prices. The tide has risen rapidly this week with increasing signs of excitement. In pig-iron history October goes down as the month in which the country's yield first reached 3,000,000 tons, and the daily output crossed the 100,000-ton mark. When war order tonnages of six figures are bandied about so commonly it is hard to believe that the year opened with a daily pig-iron production of only 51,000 tons, or half what it is now.

American Wool and Cotton Reporter—With sales of 10,750,000 bales of wool during the week under review the wool market has been considerably more active. It is said that a more general business for all kinds of wool has never been seen before. The market has been particularly active in territories, Capes, and Australians. Large trades are pending. Besides the business of the big mills about every little woolen mill in the country is running full time. It is predicted that even after the war ceases there will be nothing to warrant a decrease in values or business for some time to come. Some mills, which have been relying upon foreign business in order to keep in operation, are now running on domestic orders.

Boston News Bureau—General trade is increasing in volume and commercial interests are busy and confident. The election is bound to have a stimulating effect in financial circles. There is no doubt but that the renewed vitality of the Republican party is a favorable feature, because it indicates a coming return of the party to power which means a change in tariff by the time the European war comes to an end. A favorable factor is that railroad earnings are beginning to show substantial gains. Crops are not only moving but we are commencing to feel the benefits from the transportation of war materials.

Bradstreet—The trade and industrial stream is running fuller and in some cases is out of its banks. Warm weather is a drawback temporarily to retail trade the country over, but helps the drying of corn and the threshing of wheat, now much delayed. Jobbing trade is more active, and industry shows a still speedier pace, with some hitherto lagging lines, such as lumber, especially at the south, naval stores, coal, jewelry and shoe manufacturing, making better progress.

The Southern Lumberman—Optimism still reigns supreme in the yellow pine market. Price advances which have been repeatedly made during the past month and which have ranged in the aggregate from $1 to $2.50 on practically all items during that time are not only being maintained, but are expected to reach still greater heights in the immediate future. The hardwood market is maintaining its steady progress, and reports indicate that buying is decidedly more active, and that the sources of demand are more diversified.

Marshall Field & Co.—Current wholesale distribution of dry goods shows a healthy increase over the corresponding period of a year ago in spite of the warm weather which has tended to restrict demands upon the retailer. Road sales for both immediate and spring delivery are running ahead of the past two years, and merchants continue to come into market in much larger numbers. Collections are well ahead of a year ago.

Dun—Not only is there no step backward in general business, but each week the pendulum of progress swings over a wider area and confidence is further strengthened. Recent vagaries of the weather have not been conducive to the best results in retail distribution, yet substantial gains are nevertheless apparent in this direction. The forward movement gathers momentum in spite of various opposing influences, such as the unstability of foreign exchange, the congestion of freight at terminal points and continued dissension in the ranks of labor, and, while expansion is still most pronounced in war order lines, on the whole, conditions and prospects are much less checkered and irregular than formerly.

ATLANTIC SEABOARD

BOSTON

Pocahontas and New River fairly steady, with no price developments. Georges Creek easy, but inquiry continues active for the Pennsylvania grades. Water freights firm. Anthracite trade active.

Bituminous—There is no material change in the situation of Pocahontas and New River. While there is a large volume of coal standing at the Hampton Roads piers, it is attributed more to the slow movement of vessels the past fortnight than to dullness of trade. It is on contracts, however, that by far the largest tonnage of these coals is moving, both spot and export inquiry being very light. Concessions are still being made on small tonnages for delivery before Jan. 1, but most of the agencies are adhering closely to the $2.85 basis for deliveries through to Apr. 1. The fact that the Pennsylvania grades are on the upward trend is bound to be reflected in the Hampton Roads situation sooner or later.

The various distributors inland from Boston, Portsmouth, etc., continue their active canvassing for contracts the next coal year. Prices on cars Mystic Wharf, Boston, are still freely quoted at $3.50 for such contracts, but the response from buyers so far has not been especially encouraging.

Georges Creek tonnage is being affected somewhat by the slack demand for export. Shipments to New England are coming forward regularly, although it is expected that car supply will begin to curtail the volume of this grade available for Tidewater.

The market on the choicer grades from Pennsylvania continues fairly active. No advance can be reported over quotations of a week ago, but on the part of shippers there is the same indisposition to quote for extended delivery.

All-rail trade is in good shape, a favorable movement on contract being especially noticeable. It becomes increasingly evident that plants with ample storage are accumulating coal in anticipation of difficulties later on.

Water freights are steady at 80@85c., Hampton Roads to Boston, on boats of 2,500 tons upward. Rates from New York to Providence are a trifle easier, 50c. rather than 55c. being the current quotation, the mild weather being a factor.

Anthracite—The demand is seasonable in all directions. What the weather lacks is more than made up by the desire of most dealers to keep on hand as large stocks as possible. The shippers are still able to fill orders without much delay. The recent ruling by the Pennsylvania Supreme Court unfavorable to the Pennsylvania state tax is a subject of great interest in this market.

Bituminous quotations, f.o.b. loading ports at points designated, are about as follows, per gross ton:

	Philadelphia	New York	Baltimore	F.o.b. Mine
Clearfields	$2.25@2.75	$2.55@3.00	.....	$0.95@1.50
Cambrias and Somersets	2.45@2.95	2.70@3.20	.....	1.20@1.65
Georges Creek	2.92@3.02	3.22@3.32	$2.85@2.95	1.67@1.77

Pocahontas and New River prices, on cars Boston, are $3.50@3.73; Providence, $3.50@3.68; and f.o.b. loading port at Hampton Roads, $2.80@2.85.

NEW YORK

Anthracite demand heavy, but car supply short. Independents getting full company circular. Holidays interfere with mining. Demand for bituminous coal active and contract prices advanced. Lack of vessels interrupts export business.

Anthracite—The hard-coal market continues its activity, notwithstanding some mild weather. Buyers seldom have an opportunity of picking up a cargo of prepared coals at less than the full company circular and then only when the shipper happens to be long on that particular size. Mine operations have been interfered with by three holidays. On other days the mines worked full time unless prevented by the lack of cars. Transportation troubles curtail shipments and they promise to become greater. Already some shippers are becoming anxious and are advising their customers to take advantage of the present situation and stock up. Early this week shortages of egg, stove and chestnut were heard of.

Tidewater demand is no heavier than a week ago, but from New England points the call is heavier and prices stronger than in the Metropolitan district. Heavy demand also comes from the provinces, where the dealers are stocking up to guard against storms and transportation tie-ups. Shipments to Lake points are large and the line trade is taking its full quota.

Of the prepared coals stove is the shortest. Egg and chestnut are easier. Steam sizes are tightening and there is no accumulation. No. 1 Buckwheat is scarce and commanding the full circular. The better grades of Nos. 2 and 3 are out of the market.

Quotations, f.o.b. New York tidewater gross tons are as follows:

	Lower Ports		Upper Ports	
	Circular	Individual	Circular	Individual
Broken	$5.05		$5.10	
Egg	5.30	$5.20@5.30	5.35	$5.25@5.35
Stove	5.30	5.20@5.30	5.35	5.25@5.35
Chestnut	5.55	5.50@5.55	5.60	5.55@5.60
Pea	3.50	3.25@3.50	3.55	3.50@3.55
Buckwheat	2.75	2.25@2.75	2.80	2.25@2.80
Rice	2.25	1.85@2.25	2.30	2.00@2.30
Barley	1.75	1.50@1.75	1.80	1.75@1.80

Bituminous—Demand for soft coal continues strong. While there is more coal at Tidewater than a week ago, prices remain firm and there has been no letting up. Owing to the activity in the local market some operators are sending all surplus coals eastward which may result in the overstocking of the local docks unless colder weather sets in or buyers stock up. Cars continue scarce and no improvement is in sight. In the majority of districts operations are curtailed. No operator seems to be getting his full quota of cars.

Contract movement remains active, while there is little of the better grades in the spot market. Efforts of large consumers to renew expiring contracts at old prices have met with failure, the agencies holding at close to existing market figures. In most instances the advanced prices were accepted.

Demand from the New England states is heavy and there is considerable coal being sent there at higher than Tidewater prices. Slack advanced another five cents during the week, making the mine price at from 95c. to $1. Lack of vessels continue to hamper the export trade, but the call remains active. Bunker demand is strong.

Current quotations, gross tons, f.o.b. New York harbor, are about as follows:

	South Amboy	Port Reading	St. George	Mine Price
Georges Creek Big Vein	$3.20@3.30	$3.20@3.30	$3.20@3.30	$1.75@1.85
Georges Creek Tyson	2.95@3.00	2.95@3.00	2.95@3.00	1.40@1.45
Clearfield:				
Medium	2.80@2.85	2.80@2.85	.....	1.25@1.35
Ordinary	2.75@2.80	2.75@2.80	.....	1.20@1.25
Broad Top Mountain				1.25@1.45
Cambria County:				
South Forks	3.05@3.10	.....	.....	1.50@1.60
Nanty Glo	2.90@3.00	.....	.....	1.35@1.45
Barnesboro	2.85@2.90	.....	.....	1.30@1.35
Somerset County:				
Quemahoning	.....	2.90@3.00	2.90@3.00	1.35@1.40
Medium	2.80@2.90	2.80@2.90	2.80@2.90	1.25@1.35
Latrobe	2.70@2.75	.....	.....	1.15@1.20
Greensburg	2.90@3.00	.....	.....	1.25@1.35
Westmoreland	3.20@3.30	.....	.....	1.45@1.55
West Virginia Fairmont ¾		2.70@2.80	2.70@2.80	.90@1.10
Fairmont mine-run		2.70@2.75	2.70@2.75	.95@1.00
Steam		2.70@2.80	2.70@2.80	1.15@1.25
Western Maryland		2.70@2.80	2.70@2.80	1.15@1.25

PHILADELPHIA

Anthracite now going strong, with big October tonnage. Pea advanced 25c. Stove strong and chestnut improving. Egg still slow, with pea heavily sold. Buckwheat active, but rice dull. Collections in good shape. Healthful tone to bituminous, with general price increases.

Anthracite.—The trade is now in its stride, with good business reported from all quarters. The advance by the big companies of 25c. per ton on pea coal, bringing the selling price up to $2.25 per gross ton, was one of the leading developments of the week. The action came as a surprise and though apparently an important step, it is really only a move to make it possible to get the advanced price by the first of the year. It is certain that very little coal will be sold at the new price before that time, as buyers are generally protected on the $2 price until Jan. 1. However, it is sure to stimulate buying, as there is no doubt that the new price will eventually be effective. The individuals now expect to have an opportunity to recoup for the sacrifices they made on this size in the spring and summer; they will get practically all of the business of the small dealers, who only buy as they actually need supplies.

The tonnage of the other sizes has increased greatly. Broken is easy; since the price of coke has gone up a number of companies report inquiries for this size from gas companies. With all collieries working to the full production, egg continues difficult to move and sales were made at $3.50 at the mines, without the tax. Stove seems well able to hold its own, and chestnut has improved to such an extent that the better grades have very little difficulty in getting full circular.

Buckwheat remains in constant demand and there are only a few of the harder grades in this size that show any tendency to drag. Considerable of this grade is going into private storage, as is also rice.

An effort was made by the Philadelphia Coal Exchange this week to bring an end to the retail price war, but at a "good fellowship" meeting engineered by the organization the price cutters refused to get together and some of the leaders even declared in strong language they were watching their competitors' every move with the express intention of not allowing themselves to be undersold and if necessary would go even lower. At this time they are taking extremely small profits on their best seller, pea coal, by delivering it at $4.50 where it is costing them $3.45 plus their expensive advertising. As to the larger sizes, they are receiving 50c. per ton less than they did this time last year.

The circular prices per gross ton at the mines and for tide shipments f.o.b. Port Richmond are as follows:

	Line	Tide		Line	Tide
Broken	$3.50	$4.75	Pea	$2.50	$3.25
Egg	3.75	5.00	Buckwheat	1.25	2.25
Stove	4.00	5.00	Rice	.85	1.75
Chestnut	4.15	5.25	Barley	.50	1.50

Bituminous.—Shippers are slow to admit that there is a particularly heavy trade, yet the fact remains that everyone has more orders than can be filled and the railroads report an exceptionally large tonnage moving. Of course the unfilled orders are due to the short car supply.

The export trade continues quiet and it is gradually developing that the embargo of the British Government against the export of native coal some months ago did not remain in effect more than a month. Although no public notice has been made of its removal, it is known for a fact that large shipments of coal are being made from the British Isles not only to the allied nations, but to neutral countries, particularly those of South America. Inasmuch as there is an extraordinary demand for vessels to carry the exceptional general tonnage offering, rates for coal remain very high.

The price per gross ton at the mines on the various grades of coal during the past week averaged about as follows:

Georges Creek Big Vein	$1.70@1.80	Fairmont gas, ¾	$1.35@1.45
South Fork Miller Vein	1.55@1.65	Fairmont gas, mine-run	1.20@1.25
Clearfield (ordinary)	1.20@1.30	Fairmont gas, slack	.90@1.00
Somerset (ordinary)	1.20@1.25	Fairmont lump, ordinary	1.15@1.20
West Va. Freeport	1.05@1.15	Fairmont mine-run	1.00@1.10
		Fairmont slack	.90@1.00

BALTIMORE

Car supply remains the dominating feature of the market. Demand growing stronger and the price list for all available coal is tightening. Exports restricted.

The dominant feature of the coal trade situation is the car supply. Orders are fairly plentiful but producers and shippers are pulling out of the open market. Certain coals, for the most part of the better grade, are entirely out now.

The price list is naturally tightening under such conditions. If there were more coal on the market to offer it would probably go up faster as it is the best grades that have been withdrawn that are so urgently needed now. Slack went up with a bound the past week, advancing from 15 to 20c. and the market being restricted and strong at $1 in most cases.

Prices to the trade may be quoted about as follows where there is any free coal to offer:

	Mines	Balt.*	Fairmont	Mines	Balt.*
Geo. Crk. Big Vein	$1.80	$2.98	Ordinary mine run	$0.95	$2.33
Geo. Crk. Tyson	1.50	2.68	Ordinary ¾	1.00@1.10	2.43@2.53
Clearfield	1.30	2.48	Ordinary slack	1.00	2.43
South Fork	1.50	2.68	Low sulphur mine-run	1.20	2.63
Latrobe	1.10	2.18	Low sulphur ¾	1.30	2.73
Somerset (best)	1.45	2.63	Low sulphur slack	1.00	2.43
Somerset (good)	1.25	2.43			
Quemahoning	1.35	2.53			
Freeport	1.10	2.18			
Miller Vein	1.30	2.38			

* F. o. b., outside Capes.

HAMPTON ROADS

Movement both coastwise and foreign somewhat slow. Excess accumulations. Concessions made on the circular.

The movement of coal from Virginia tidewater for both foreign and coastwise consumption has been somewhat slow during the week. The demand for spot and contract business has been light and the indications are that the coming week will see little if any improvement. Coastwise shipments have practically all gone to New England with the exception of some small cargoes to one or two of the near ports South. Three cargoes for Gibraltar for orders are intended for one or more of the Italian ports, final destination being given at Gibraltar.

The accumulation of coal at the various piers is still in excess of normal. Circular prices are being quoted but indications are that these would be shaded somewhat for prompt movement. As has been the case for some time buyers from both European and South American ports are asking for c.i.f. prices which is difficult for shippers here to quote. The tonnage of bunker coal is still somewhat small as compared to normal conditions.

Ocean Charters, Clearances and Freights

VESSEL CLEARANCES

The following steamers have cleared from various ports during the week ended Oct. 30:

NORFOLK

Vessel	Destination	Tons
Narvik[1]	Stockholm	6,370
Chiswick[2]	St. Lucia	4,636
Costante[3]	Civita Vecchia	5,050
Burstad[1]	Kingston	3,000
Eliopoli[3]	Genoa	5,433
Cocovada[2]	Rio de Janeiro	3,625
Ancon[4]	Canal Zone	9,266
Liguria[3]	Porto Ferrajo	4,536
M. Critchett[1]	Puerto Plata	805
Nereus[5]	Gib for Orders	5,450
Skogstad[6]	Spain	4,500
Wellington[6]	Gib. for Orders	8,320
E. W. Murdock	Santa Cruz	2,101
Carmen[5]	Gib. for Orders	7,150
Balgray[3]	Dakar	5,850
Bennestvet[1]	Pernambuco	2,703
Allaguash[2]	Rio de Janeiro	5,093

NEWPORT NEWS

Theresa[1]	Havana	2,942
Vauxhall[7]	Naples	5,386
J. Serra[7]		3,034

BALTIMORE

Lesa Maersk	Sweden	1,900
New Sweden	Sweden	7,003
A. B. Phillips	Martinique	826
Andrea Costa	Italy	4,737
Arnola Maersk	Sweden	2,862
Ruth B. Cobb	Martinique	893
D. Palmer	Italy	4,017
St. Theodore	Italy	7,304

PHILADELPHIA

Pen. Sisters	Paramaribo	1,250
Bear Ridge[8]	Cambridge	
Temple[6]	E. Boston	
Enterprise[8]	Boston	
Draper[8]	S. Boston	
Logan[8]	Boston	
Wiconisco[8]	Portland	
Reading	Boston	
F. W. Munn	Portsmouth	
Gov. Robie	Portsmouth	
A. Wall	Casilda	1,000
M. Willey	Mayport	1,000
Leesport[8]	Portsmouth	

PHILADELPHIA—Continued

Vessel	Destination	Tons
Kohinoor[8]	Brookline	
Maple Hill[8]	Boston	
Phoenix[8]	Bangor	
Pennypack[8]	Biddeford	
Tulpehocken	Saco	
Richardson[8]	Rockport	
Ontelaunee[8]	Brookline	
Rutherford[8]	Dorchester	
Robesonia[8]	Providence	
Brookside[8]	Brookline	
Skippack[8]	Brookline	
Dorothy[9]	Charleston	
R. McNalley[9]	Charleston	
Ashland[8]	Portland	
Mahanoy[8]	Boston	
Oak Hill[8]	Boston	
Cumru[8]	Portland	
Suffolk[8]	E. Cambridge	
Lincoln[8]	Com. Point	
J. M. Haynes	C. Francais	1,102
Poviga	Italy	2,057
E. W. Hinkley	Guayanilla	1,200
W. E. Downes	F. de France	639
Merriam[8]	Salem	
Oley[8]	Portsmouth	
Molino[8]	Portsmouth	
Tamanend[8]	Lanesville	
Barry[8]	Bangor	
Paxinos[8]	Portland	

NEW YORK

Benezuela	6
San. Domingo	653
Labrador	783
Cuba	535
San. Domingo	196
Yarmouth	400
Yarmouth	145
Windsor	10
West Indies	143

[1] Smokeless Fuel Co. [2] C. C. & B [3] Pocahontas Fuel Co. [4] Crozer-Pocahontas. [5] Flat Top Fuel Co. [6] Baker Whitcley. [7] Berwind White. [8] Phila. & Reading C. & I. Co. [9] Stonega C. & C. Co.

OCEAN CHARTERS

The following charters have been reported from various sources during the past week:

PHILADELPHIA

Vessel	To	Tons	Rate
Washington	Mediterranean	3,231	
A. & M. Carlisle	Nassau	302	$3.50
Harflete	Italy		
Tenbergen	Havana	2,456	
Novo	Buenos Aires	2,200	8.50
E. Cassel	Sweden		

BALTIMORE

St. Theodore	Genoa	3,176	
R. E. Merrill	Boston[1]	2,309	
A. Maersk	Denmark	1,209	

BALTIMORE—Continued

Vessel	To	Tons	Rate
L. Maersk	Denmark	950	
A. Costa	Leghorn	2,418	
Atland	Sweden	2,744	

[1] Or Portland

VIRGINIA

E. J. Lawrence	Barcelona	2,483	$10 00
H. Palmer	Lisbon	2,400	
D. Palfer	Italy	2,315	
A. Noble	Montevideo	2,616	

ATLANTIC RANGE

Achlibster	Italy	2,820	15 60

OCEAN FREIGHTS

The steamer "Achlibster," about 7,000 tons coal capacity, is reported as having been chartered to load coals for the West Coast of Italy at or about $15.60, November loading, and three large sailing vessels have been chartered, one for West Coast of Italy, one for Barcelona, and the other for Lisbon, at or about $10 per ton, these freights paid in advance without discount, and charters paying foreign port charges and stevedore bills. $16.80 per ton has been paid on grain for the West Coast of Italy. Notwithstanding the high rates current on grain from the Plate outward coal freights to the Plate continue to advance.

The freight market is quotable about as follows:

To	Rate	To	Rate
Havana	$2.75	Bermuda	$3 00@3.25
Cardenas or Sagua	3.00@3.25	Vera Cruz	4 75@5.00
Cienfuegos	3.00@3 50	Tampico	4 75@5.00
Port au Spain, Trinidad	3.75@4.00	Rio	9.60@10.32
St. Lucia	3.75@4.00	Santos*	9.84@10.56
St. Thomas	3 25@3.50	Montevideo	9.60@10.80
Barbados	3.75@4.00	Buenos Aires or La Plata	9.60@10.80
Kingston	3 00@3.25	Rosario	10.80@12.00
Curacao	3.50	West Coast of Italy	15.60
Santiago	3 25@3.50	Barcelona**	13.20@15.60
Guantanamo	3 25@3 50	Valparaiso or Callao	7.50
Demerara	5.50@6.00	Marseilles	14.40@15.60

* Consignees paying dockage dues. ** Spanish dues for account. † Quotations on Plate coal by British steamers; neutral steamers are more difficult to obtain and the rates are always higher.

W. W. Battie & Co.'s Coal Trade Freight Report.

LAKE MARKETS

PITTSBURGH

Favorable and unfavorable influences balance. Operations at 70 to 75% of capacity, with many car shortages. Domestic demand light for the season of year.

The coal market is holding its own comfortably. Fundamental conditions as to consumption have been growing better, with cold weather approaching, iron and steel mills pushing for maximum tonnage outputs and railroads consuming more coal as well as stocking some, but there hangs over the situation the fact that Lake shipments will soon be over, releasing much mining capacity as well as furnishing more cars, and this just about balances the favorable influences.

Cars having been growing scarcer week by week and on many divisions shortages are now the rule, many mines operating fewer days than they would like. Here and there labor is less plentiful than would be desired, but there is no important shortage, at least thus far. Mine operations average 70 to 75% in the Pittsburgh district.

Domestic coal movement is very slow, the weather up to date having been unseasonably warm.

Prices have advanced slightly, the prompt market being quotable as follows: Slack, 70@75c.; nut and slack,, 90c.@$1; nut, $1@1.10; mine-run, $1.15@1.25; ¾-in., $1.25@1.35; 1¼-in., $1.35@1.45. Contract to Apr. 1: Slack, 85@95c.; mine-run, $1.15; ¾-in., $1.25; 1¼-in., $1.35, per net ton at mine, Pittsburgh district.

BUFFALO

Bituminous doing well with slack higher. All reports from the Pittsburgh district are bullish but the situation is not so strong here. Anthracite suffers from the mild weather. Orders canceled.

Bituminous—The movement is good and is increasing all the time. Practically all of the coal moving is going into immediate consumption. The railroads are stocking some, but the private consumer has only ordinary supplies on hand. It is the general belief that business in other lines besides iron and steel will be strong for the winter at least. If that is true the bituminous consumer must have a good surplus sometime during the winter and he may find it a problem to get it unless he begins to stock up soon. If fact it is probable that he has waited too long already as there are by no means cars enough to meet the demand as it is. Yet private consumers have been able to get all the coal they want at bottom prices.

The price of slack has advanced since last week, but sizes remain the same, with three-quarter not so strong as the average. Quotations are:

	Pittsburgh	Allegheny Valley	Penn Smokeless
Lump	$2.80	$2.65	$2.55
Three-quarter	2.65	2.55	.....
Mine run	2.55	2.35	2.30
Slack	2.25	2.20	2.30

These quotations are for Buffalo and eastward to Rochester on a short-ton basis. East of Rochester all bituminous is sold on a long-ton basis.

Anthracite—The trade is still suffering from the mild weather. There are some reports of orders being canceled on account of this, which is an unusual condition for this time of the year. It is likely that the consumption for the year is not going to be up to the average. The westward rail movement is not as heavy as it should be now though there is considerable moving by Lake. This is done to avoid stocking at this end. While Lake shipments are good, there is a scarcity of tonnage and vessels are often taken that are too small to handle easily at certain docks. Lake shipments for the week were heavy, amounting to 143,000 tons.

The wholesale prices of anthracite per long ton are: $5.60 for grate, $5.85 for egg and stove, $6.10 for chestnut, $4.30 for pea, $3.25 for buckwheat, $2.75 for rice, $2.50 for barley and $2.25 (not circularized) for screenings, f.o.b., with 25c. additional for delivering on board vessel.

COLUMBUS

Steam market very strong. Domestic demand slows up. Lake trade increasing with approaching close of navigation.

Business in steam coal is the best in a year and a half and prospects for the future are bright. In fact manufacturing is expanding so rapidly that some producers and shippers have difficulty in keeping up with orders. The tone of the trade is satisfactory in every way and many coal men are predicting a runaway market about the holidays.

In iron and steel circles the demand for tonnage is growing every day. But the demand is not confined to that line by any means and other lines of manufacturing are also prospering. Contracting is more active as quite a few expire from this time until the first of the year. In domestic lines there is a slight lull, due to the continued warm weather, Retailers are holding up shipments that were ordered some time ago but comparatively few cancellations have been reported. Retail prices are firm all along the line.

The Lake trade is rushing as the season draws to a close. Reports from the Northwest show that the congestion on the docks is passing away and there will be a rush from now until the closing of navigation. Chartering of boats is difficult. The Hocking Valley docks at Toledo handled more than 65,000 tons during the week ending Oct. 29 and the total tonnage handled by the docks since the opening of navigation is 2,251,000.

There is an increasing demand for anthracite in central Ohio territory and prices are ruling firm. Coke is also in good demand and many predict a scarcity within a very short time.

Prices in Ohio fields are as follows per short tons, f.o.b. mines:

	Hocking	Pomeroy	Eastern Ohio	Kanawha
Re-screened lump	$1.60	$1.65	.....	.....
Inch and a quarter	1.50	1.50	$1.35	$1.50
Three-quarter-inch	1.35	1.40	.....	1.35
Nut	1.25	1.30	.....	1.25
Mine-run	1.15	1.20	1.05	1.10
Nut, pea and slack	.70	.75	.65	60
Coarse slack	.60	.65	.55	.50

Mines have been working at about the following percentages of full capacity:

District	Week Ended Oct. 9	Oct. 16	Oct. 23	Oct. 30	District	Week Ended Oct. 9	Oct. 16	Oct. 23	Oct. 30
Hocking	50	55	60	65	Cambridge	50	60	60	65
Jackson	30	40	60	50	Massillon	55	60	45	70
Pomeroy	65	85	65	90	Eastern O.	80	85	85	80
Crooksville	45	50	85	65					
					Average	55	62	65	69

TOLEDO

Domestic quiet due to mild weather. Steam grades active. Car supply short.

The domestic trade is quiet owing to the mild weather but there is an excellent tone to the market. A decided shortage of cars is reported. Mines on the C. & O. are not averaging over three days a week; the L. & N. is easier than most of the roads but the supply is tightening on this line also. The Pennsylvania is having difficulty in securing sufficient gondola cars due largely to the great activity in the steel industry.

Steam coal is in good demand and Pocahontas mine-run is steady at $1.40. Some of the larger companies claim to be entirely sold up on Pocahontas and there does not seem to be any surplus in the mine-run sizes. There is neither a shortage nor a surplus in the prepared sizes. Kentucky operators are reported in good shape and are getting higher prices for their product than for several years. West Virginia coal is stronger than a month ago. Mine-run is selling at 90c. and $1. Domestic 4-in. lump which a few weeks ago was bringing $1.25@1.50 is now selling at $1.50@1.75.

CINCINNATI

In spite of warm weather and small demand, the short car supply has resulted in a scarcity of fuel. No prospects for improvement in sight.

The car shortage is now the one big factor in the coal market. In some cases no cars at all were obtainable the latter part of the week, although conditions showed some improvement earlier. The betterment was short-lived, however, giving way to even a greater scarcity. Failure to return cars from the Northwestern territory seems to be the principal difficulty just now, although it is also true that immense traffic requirements have found the railroads unprepared.

DETROIT

Steam coal trade is less active. Warm weather continues to check domestic business and delay anthracite distribution. Lake trade is light.

Bituminous—Inquiries and orders for steam coal have become less urgent. It is not a serious lapse, but rather a sort of easing off, which is not expected to continue long, or largely reduce the volume of sales. Weather conditions continue unfavorable to steady expansion in the trade. Orders are straggling and for small amounts, while retail yards seem well supplied with stock.

Speculative shipments are greatly diminished and are not a disturbing factor in prices. Fine coal is sold readily, though lump and egg is less easily moved and at intervals is sold below schedule.

Anthracite—Deliveries of anthracite are delayed by warm weather. Retail yards are liberally supplied and little busi-

ness is going to the shippers. Shortage of cars in the producing districts is causing some delays which are expected to increase later in the season.

Lake Trade—With iron ore shippers increasing season schedules, and high carrying rates in the grain trade, vessel owners are striving to increase dispatch on downbound freight. The coal movement is now restricted almost entirely to contract vessels, except in the case of small cargoes to ports not on regular routes.

LOUISVILLE

Trade continues to expand but prices are still under some pressure due to mild weather.

The past week has brought a good increase in activity and given considerable buoyancy to the Kentucky coal market. Mild weather is holding up any advance in prices on domestic sizes, although the trade will endeavor to put another ten cents on for November. Steam coals are better and numerous inquiries, together with prospective big purchases, are productive of optimism. Car shortages are still curtailing operations.

Eastern Kentucky coals have sold, f.o.b. mines, long ton basis, from $1.75 to $2.10 for the block and $1.25 to $1.50 for egg. In western Kentucky, lump coal is selling above and below $1.25. Some improvement has been noted in the steam coal situation due in a large part to the fact that the Illinois Central has been taking run-of-mine coal instead of mixed as heretofore.

BIRMINGHAM

Coal business still improving, particularly on lump coal. Car supply outlook acute.

A substantial improvement is being felt, both on steam and lump but, especially on the latter, and a few cool days will give the operators about all they can do to fill orders. The tonnage being moved on steam coal is larger than for some time, and the prospects are good for a steady improvement, though the car supply is giving some trouble, and the operators will be seriously handicapped within thirty days unless conditions improve in this line.

COKE

CONNELLSVILLE

Spot furnace coke high. Foundry coke advanced. Production and shipments at new record rate for the year.

There have been a number of sales of strictly spot furnace coke in the past ten days at $2.75, but there has usually been some coke that could be picked up at around $2.60, the top price usually being paid only when the seller could give car numbers. Not much has been done by way of contracting for next year, the bulk of the expiring contracts having already been taken care of. The Youngstown Sheet & Tube Co. will have occasion to buy for its four furnaces, requiring about 18,000 tons per stack per month, but only for about four months of the year, as the company's byproduct ovens are expected to be completed about May 1.

Foundry coke has been advancing rather sharply. Several sales of carloads for prompt shipment have been made at $3, and in one instance at $3 to a dealer, this not including the 15c. brokerage the dealer is supposed to make. The amount of coke available at less than $3 seems to be limited, though there is some. Operators making a specialty of high-grade foundry coke are disposed to ask sharp advances on contracts for the first half of next year, and one leading operator has already fixed a minimum of $3.25. Last May and June there was much relatively cheap foundry coke offered, by producers who did not cater particularly to the foundry trade, and such operators are much less disposed to figure in the foundry coke market at present, when furnace coke is in such demand. There will probably be a fair amount of contract business come up in foundry coke, as when contracts were made last May and June most of the operators made more or less of an attempt to induce buyers to be content with six month contracts, to Jan. 1. We quote: Prompt furnace, $2.60@2.75; contract furnace,$2.25@2.50; prompt foundry, $2.90@3; contract foundry, $2.90@3.25, per net ton at ovens.

The "Courier" report production in the Connellsville and lower Connellsville region in the week ended Oct. 23 at 428,319 tons, an increase of 7,228 tons, and shipments at 437,548 tons, an increase of 14,903 tons.

Buffalo—This market is unable to keep pace with the feverish state of the coke market, as reported from the ovens. Some of them quote prices that could be obtained here and some refuse to quote at all. Advances are reported day by day. It is true that the extreme scarcity of cars is the reason for much of this. Buffalo quotes best foundry at $4.85 and stock at $3.75.

Chicago—Foundry coke shows advancing tendencies, and byproduct sizes are strong at higher prices. Connellsville is up to $5.50, and quotations at this price are only made for immediate acceptance. Some coke shippers are asking fictitious prices to prevent placing of orders. Prices per net ton f.o.b. cars Chicago are as follows: Byproduct foundry, $5.25 to 5.50; byproduct domestic, $5.25; Connellsville, $5.50; Wise County, $5 to 5.25; gas coke, $4 to 4.25.

Birmingham—On account of the large number of blast furnaces operating in this district, the coke market is stronger than it has been for two years, several large contracts having been closed recently on furnace coke at satisfactory prices to the manufacturers, shipments to extend over the next twelve months. Foundry coke shows some improvement also.

MIDDLE WESTERN

GENERAL REVIEW

Warm weather prevails all week. Domestic demand easier. Screenings maintain their strength. Prices firmly held.

Demand has not undergone any expansion since last report because of the mild weather. The retail trade is quiet in the city, but some country dealers have taken cognizance of the deficiency in railroad equipment and commenced to put in reserve stocks. Demand for steam sizes is more active and screenings if anything are stronger. Prices on all grades are holding steady at schedules. Far-sighted manufacturing interests are showing some inclination to accumulate stocks but many industries not having facilities for storage are obliged to buy on a hand-to-mouth basis and will undoubtedly pay the penalty later. Consignment coal on tracks is practically nil.

If the warm weather continues another week, some operators will curtail output rather than reduce prices. Heavy production has not had any evil effects as yet, because reserve stocks are small. Considerable pressure is still exerted on some shippers for contract deliveries, and more than the usual amount of contract coal has been moving at this time. Many shippers had a considerable accumulation of orders on their books which they have been filling during the past week because of the lull in demand. Farmers are taking advantage of the fine weather to move their crops to market, and country dealers report increased buying in this trade.

CHICAGO

Milder weather brings out some concessions, but market generally well maintained. Shippers catching up on delayed deliveries. Steam continues active, manufacturing concerns showing more interest.

Slight concessions have been made by some of the Franklin County operators to move the coarser sizes, because of a lull in demand and extraordinary heavy production. Screenings are selling higher, and in the last two days have averaged 60c. Egg is lagging, and No. 1 nut is falling behind. It is very likely output will be curtailed to meet the market situation if warm weather continues. Large piles of fine coal are now being dumped on the ground at Franklin County mines. Williamson County coals are in good demand with prices unchanged. Saline County screenings show greater strength.

Springfield mines have about covered all unfilled orders for domestic sizes. Screenings are a trifle softer, the prevailing price being approximately 45c.

The demand for Indiana steam coal is more urgent, due to inadequate car supply; the larger mines have been losing an average of one day weekly through this cause. Orders for domestic sizes have eased off somewhat, owing to moderating weather. The price position of all Indiana coals except egg and nut is strong, and colder weather will see marked advances.

While production of West Virginia coals is reported to be reaching unprecedented proportions, the demand continues to grow for both domestic and steam sizes, and many contracts are now being completed. The Western demand is not quite as brisk, but there is about enough coal coming into the market to meet requirements. Splint lump has been reaching the high level of $1.90 during the last week. Pennsylvania smokeless is bringing about the same price as the West Virginia product, and owing to car shortages the minimum tonnage is reaching this market.

The Hocking market is strong, and recent advances in the circular have been well maintained. Increased buying of steam sizes is a prominent feature while the domestic trade is brisk. The better grades of Hocking lump are now touching $1.75, and mine run is not sold below $1.15, many orders being filled at $1.25. Screenings are strong.

Kentucky coals are now well sold up on every size, and car and labor shortages are curtailing production. Block commands from $1.75 to $2.25, and shipments of the coarse sizes are rapidly falling behind orders.

Anthracite orders have receded in conformity with weather conditions. October prices are being quoted in Chicago for November shipments. Current orders are being filled with little delay.

Quotations in the Chicago market are as follows:

	Williamson and Franklin Co.	Springfield	Sullivan	Clinton	Knox and Greene Cos.
Lump	$1.65@1.75	$1.60@1.75	$1.50@1.60	$1.35@1.50	$1.40@1.60
Steam lump	....	1.25@1.35	1.20@1 30	1 20@1.25	1.25@1.35
2 and 3-in. lump	....	....	1.40@1.50	1.35@1.40	1.30@1.40
1¼-in. lump	....	....	1.30@1 35	1.15@1.25	....
Egg	1.65@1.75	1.50@1 60	1.10@1.20	1.20@1.30	1.15@1.25
Nut	1.65@1.75	1.55@1.65	.95@1.05	1.10@1.15	1.00@1.10
No. 1 washed	1.75	....	1.50@1.60	....	....
No. 2 washed	1.40@1.50	....	1.40	....	....
No. 1 nut	1.65@1.75	....	....	....	....
No. 2 nut	1.40@1.50	....	....	....	....
Mine-run	1.10@1.15	1.05@1.10	.85@ .90	.95@1.05	.85@1.00
Screenings	.50@ .65	.40@ .55	.45@ .55	.55@ .65	.75@ .80

	Harrisburg & Saline Co.	E. Kentucky	Pocah. & W.Va.Smok'l.	Penna. Smokeless	Hocking
Lump	$1.60@1.75	$1.60@2.10	$2.25	$2 00@2 25	$1.60@1.85
1¼-in. lump	1.25@1.30	....	....	1.35@1.50	1.50
Egg	1.60@1.75	1.40@1.75	2.25	2 00@2.25	....
Nut	....	1.35@1.65	1.75	1.40@1.60	1.30
No. 1 washed	1.75	....	....	....	....
No. 2 washed	1.40	....	....	....	....
Mine-run	1.15	1.15@1.25	1.25@1.40	1.25@1.40	1.10@1.20
Screenings	.50@ .65	.65@ .75	....	....	.65@ .70

Kanawha 3-in. splint, $1.50@1.90.

ST. LOUIS

Domestic grades weak due to mild weather. Delayed orders well cleaned up and operations less active.

Warmer weather has made the market weaker on the large sizes. Prices are steady in the main, but some sales were made below quotations. All back orders have been cleaned up and fewer mines are in operation than last week. Screenings, under the reduced output, have strengthened 5 to 10c. In spite of balmy weather general conditions are better than this time last year and there is less price demoralization, due to exchange of information which prevents over-production.

Quotations f.o.b. mines ranged on the following basis per short ton.

	Frnk. Co.	Wlmson. Co.	Staunton	Standard
6 in. lump	$1.50@1.75	$1.50@1.75	$1.25@1.50	$1.15@1.25
8-in. lump	.....	.....	.....	1.25
2-in. lump	.....	.....	1.15@1.20	1.05@1.10
3x6 egg	1.35@1.75	1.50@1.55	.....	1.00
No. 1 nut	1.50@1.75	1.50@1.75	.....	.85
No. 2 nut	1.40@1.50	1.40@1.50	.....	.55@.65
No. 1 washed	.....	1.65	1.40@1.60	.....
No. 2 washed	.....	1.25	1.10@1.25	.....
No. 3 washed	.....	1.25	1.00@1.25	.....
No. 4 washed	.....	1.20	1.05	.....
No. 5 washed	.....	.60@.70	.50@.60	.....
Screenings	.55@.60	.55@.60	.30@.35	.30@.35

Freight rates: From inner group, St. Louis 57½c., East St. Louis, 37½c. Outer group, St. Louis, 72½c., East St. Louis 52½c.

INDIANAPOLIS

Weather unfavorable for domestic grades, but steam coal trade gaining in volume. Increase in mine operations. Prices hold firm.

At the present rate of improvement, it is expected that full running schedules will be in effect before this month expires. October weather was mild and this cut down the demand for domestic grades perceptibly. Steam grades continue to move well to railroads and manufacturing plants and further improvement is expected in this department. The transportation companies have been able to keep enough cars at the mines, but it seems to be some effort to do it and this probably presages trouble later on.

Screenings sell for 50 to 65c., according to destination, as well as conditions of sale and shipment. No. 4 screenings have not fallen below 80c., f.o.b. mine. Most contracts for domestic grades have been filled and consumers are ready for cold weather. Retail prices, like mine prices, are unchanged from the level recently prevailing.

DULUTH

Docks continue active, although lacking the stimulus of cold weather. Receipts show no change. Prices are firm.

Shipments continue at the recent high level and the market is strong. No announcements as to any changes in prices have yet been made but coal men generally anticipate an advance in the very near future. The retail trade is taking a fair volume although the mild weather has curtailed business in this direction to some extent. Larger purchases by the railroads are noted and a fair tonnage has moved to their storage points in the Northwest. Receipts show no material changes, but it is believed that from now to the close of navigation receipts will be larger. Quotations per short, ton f.o.b. cars, docks, at Duluth are as follows:

	Yough	Splint	Hock	Smokeless	Elkhorn
Lump	$3.40	$3.40	$3.40	$4.75	$3.75
Dock run	3.10	3.10	3.05	3.25	3.25
Stove or nut	3.40	3.40	3.40	4.75	3.65
Screenings	2.40	2.40	2.25	2.75	2.40

No great activity is noted in the anthracite trade, but the volume of business is well maintained despite the mild weather that has prevailed throughout the entire Northwest for the past ten days. Quotations are as follows: Egg and stove, $6.85; nut, $7.10; pea, $5.55 and buckwheat, $4, all f.o.b. cars, per short ton, at Duluth.

KANSAS CITY

There is a stronger demand for domestic coal and an increase of 5c. in the price of mine-run. The dealers take orders subject to delay and cannot promise shipment within two weeks. It is impossible to get any semianthracite and the larger companies are refusing orders for that coal at $3. The demand from the steam users has fallen off slightly. The outlook is particularly promising.

PORTLAND, ORE.

Mild weather delays heavy business in coal for domestic purposes and trade is only moderately active.

Mild weather continues here and the demand is light so far this fall. Dealers do not look for any heavy movement until there is a decided change in the weather. There has been no change in prices here for several weeks and none is likely. So far there is no indication of any coal being brought here from Australia the coming winter, although several cargoes are reported on the way to San Francisco.

FOREIGN MARKETS

GREAT BRITAIN

Exports—British exports for September and the first nine months of the past three years were as follows:

	September			Nine Months		
To	1913	1914	1915	1913	1914	1915
Russia	668,472	17,398	3,173	4,462,660	3,066,925	38,668
Sweden	394,314	633,546	195,722	3,275,151	3,055,335	2,091,047
Norway	174,861	233,754	224,461	1,688,549	1,907,090	2,096,675
Denmark	275,724	405,842	291,764	2,213,216	2,267,312	2,522,950
Germany	833,326	.....	.....	6,783,574	5,256,765	.....
Netherlands	154,904	276,031	174,996	1,544,894	1,457,102	1,329,239
Belgium	164,448	44,416	.....	1,546,634	1,084,401	.....
France	1,040,489	569,667	1,687,755	9,567,410	9,040,744	13,224,756
Portugal[1]	100,840	87,177	96,766	1,030,124	923,186	787,422
Spain[4]	270,678	227,401	155,553	2,745,182	2,458,578	1,551,630
Italy	810,994	697,293	558,638	7,150,025	6,557,270	4,402,998
Aus. Hung.	53,761	.....	.....	796,407	564,362	.....
Greece	76,091	19,264	6,856	507,251	489,748	280,054
Roumania	30,103	.....	.....	149,517	218,218	.....
Turkey	51,501	.....	.....	184,954	417,437	10,324
Algeria	66,505	39,733	91,738	952,241	780,627	726,326
Portugal[5]	18,624	37,824	5,405	190,082	153,286	150,422
Chile	27,204	8,040	271	457,641	360,391	38,655
Brazil	158,896	59,528	11,951	1,445,749	966,618	424,282
Uruguay	65,642	18,866	22,120	568,142	480,522	252,358
Argentine	267,142	153,016	132,448	2,725,303	2,362,722	1,289,440
Channel Is.	14,509	19,915	14,840	121,833	127,223	100,460
Gibraltar	14,940	24,447	27,689	254,791	239,206	269,784
Malta	36,249	13,649	5,927	506,361	311,041	114,494
Egypt[3]	258,232	133,177	136,000	2,259,230	2,193,888	1,080,435
Aden[3]	22,930	22,125	5,095	127,678	118,850	110,889
India	8,827	9,222	5,005	125,832	127,261	23,085
Ceylon	25,601	17,969	.....	174,358	223,037	38,730
Miscell'ous	111,373	89,488	37,860	962,999	907,204	459,089
Coke	125,356	130,264	108,471	838,055	824,325	684,689
Briquettes	179,041	107,001	96,133	1,542,365	1,431,938	960,636
Total	6,501,578	4,096,453	4,096,637	56,898,208	50,372,612	35,059,537
Bunker	1,825,057	1,332,935	1,064,967	15,545,617	14,581,962	10,722,894

[1] Includes Azores and Madeira. [3] Including Anglo-Egyptian Sudan. [3] And dependencies. [4] And Canaries. [5] West Africa.

Note—The figures in the above table do not include Admiralty and certain other shipments.

PRODUCTION AND TRANSPORTATION STATISTICS

BALTIMORE & OHIO

The following is a statement of coal and coke tonnage moved over this system and affiliated lines during September and the previous two months:

	July		August		September	
	1915	1914	1915	1914	1915	1914
Coal	2,887,918	2,594,407	3,009,028	2,769,45	3,034,271	2,878,963
Coke	344,557	255,650	345,258	242,28	331,224	237,661
Total	3,232,475	2,850,057	3,354,286	3,011,73	3 365,495	3,116,624

NORFOLK AND WESTERN

Destination of shipments over this road for September and the nine months of this year and the last year were as follows, in short tons:

	September		Nine Months	
Coal	1914	1915	1914	1915
Tidewater, foreign	334,205	430,053	1,587,552	3,064,596
Tidewater, coastwise	347,571	259,128	2,917,784	2,439,292
Domestic	1,828,140	2,255,551	15,474,771	16,130,141
Coke				
Tidewater, foreign	142	4,621	339	23,080
Domestic	58,970	71,762	807,104	645,198
Total	2,569,028	3,021,115	20,787,550	22,302,307

MIDDLE WESTERN ROADS

The following is a comparative statement of coal handled over the 17 principal Middle Western railroads for August and the first eight months of this year, compared with the same periods last year:

	August		8 Months	
	1914	1915	1914	1915
Illinois Central R.R.	790,530	637,650	4,774,645	4,634,390
C. & E. I. R.R.	562,732	498,832	4,333,519	3,750,660
C. B. & Q. R.R.	494,762	492,260	3,463,628	3,310,311
C. C. C. & St. L. R.R.	423,233	412,072	3,047,543	3,151,229
Vandalia Line	376,230	357,496	2,784,502	3,072,115
C. T. H. & S. E. Ry.	237,177	226,343	1,945,975	1,934,189
C. & A. Ry.	142,011	158,676	1,123,329	1,202,516
Wabash R.R.	150,905	119,741	937,827	989,121
St. L. I. M. & S. Ry.	157,107	142,646	978,768	976,729
Southern Ry.	115,755	88,521	1,019,042	705,290
B. & O. S. W. R.R.	54,952	75,535	465,408	623,531
St. L. T. & E. R.R.	69,914	49,696	428,248	380,663
St. L. & O. F. Ry.	45,372	50,829	334,368	400,542
L. & M. Ry.	43,306	34,445	296,298	299,440
C. I. & L. Ry.	38,100	57,465	382,605	426,078
C. P. & St. L. Ry.	28,690	27,967	221,244	260,074
C. & N. W. Ry.	22,317	30,675	203,510	262,904
	3,832,146	3,460,849	26,740,459	26,379,782

CHICAGO LAKE RECEIPTS

Coal receipts at the Port of Chicago and South Chicago, classified by shipping points, for the month ending Oct. 31:

	1915		1914	
From	Hard	Soft	Hard	Soft
Buffalo	71,088	16,231	92,244	x
Oswego	13,594	x	22,879	x
Ashtabula	x	46,950	7,013	2,600
Cleveland	5,571	43,059	x	14,471
Toledo	x	44,739	x	20,631
Conneaut	x	18,000	x	x
Sandusky	x	22,237	x	x
October total	90,253	191,216	122,136	37,702
Season total	686,897	711,672	654,513	571,910

I. C. C. DECISION

Investigation and Suspension Docket No. 661—Allowances on anthracite coal at Hauto and Nesquehoning, Penn.

The Central Railroad Co. of New Jersey proposed by the tariffs under suspension to pay to the Lehigh Coal and Navigation Company certain lateral allowances out of the rates on shipments of anthracite coal from Hauto and Nesquehoning, Penn.; Held, That the allowances would effect unlawful discrimination and constitute unlawful rebates. Tariffs ordered canceled.

I. C. C. No. 6821—David Rutter & Co., vs. Chicago and North Western Railway Co., Et. Al.

Upon complaint that defendants have been and are assessing unlawful, unreasonable, and discriminatory charges on carload shipments of coal from eastern mines to complainant's yard at Evanston, Ill., Held:

1. In the absence of joint rates or a specific manner of constructing through rates the lowest combinations via the routes of movement are the lawful rates.

2. The lawful through rates from eastern mines to Evanston were and are the rates to Greenwood street station, plus the local distance rate of the Chicago & North Western to Evanston and a reconsigning charge under the conditions named in the tariff, except that where rates to Greenwood street station are limited by tariff to shipments unloaded there the combination is made on Chicago instead of on Greenwood street station.

3. The allegation of unjust discrimination is not sustained by the record.

4. The traffic here involved is through traffic and the reasonableness of the rates applicable thereto must be considered from the standpoint of the through rates in their entirety. So considered, the evidence does not show that they are unreasonable.

5. Defendants directed to refund all overcharges to complainant, with interest.

I. C. C. No. 6849—Atlas Coal and Coke Co. vs. Pennsylvania R.R. Co., Et Al.

Charges collected for the transportation of a carload of coal from Viola Colliery No. 1, Penn., to Calvert yard, Baltimore, Md., reconsigned to Canton Diers, Baltimore, Md., not found to have been unreasonable. Complaint dismissed.

Coal Contracts Pending

The purpose of this department is to diffuse accurate information of prospective purchases and prices with a view to affording equal opportunity to all, promoting market stability and inculcating sound business principles in the coal trade.

✚Indicates contracts regarding which official information has been received.

New Business

✚**1611—Williston, N. D.**—The County Government will receive bids until 9 a.m., Nov. 22, for furnishing coal as may be required at the Court House and Jail during the ensuing year. All bids must be accompanied by a certified check for $50. Address County Audr. M. H. Aaen, Williston, N. D.

✚**1612—Aliquippa, Penn.**—The Village Government received bids until 7 p.m., Nov. 1, for furnishing approximately 500 bu. of 1¼-in. lump coal to be delivered at the Municipal Building. Address Secy. L. S. Patton, Aliquippa, Penn.

✚**1613—Knoxville, Tenn.**—The City Government will receive bids until noon Nov. 8, for furnishing coal and coke as may be required during the coming fiscal year. Bids must be submitted according to specifications on file at the Recorders Office. Address Recorder R. P. Williams, Knoxville, Tenn.

✚**1614—Hackettstown, N. J.**—The Building Committee of the Board of Education received bids until 8:30 p.m., Oct. 28, for furnishing approximately 150 tons of Scranton pea coal to be delivered as required at the Public School Building. Address Wallace Taylor, Bldg., Com., Bd. of Edu., Hackettstown, N. J.

1615—Philadelphia, Penn.—S. B. & B. W. Fleisher, Inc., consume approximately 2,550 tons of buckwheat coal per annum, for which they usually contract some time in December. Deliveries are made by railroad, at the rate of 50 tons per week and the company has storage capacity for 300 tons. Address, Pur. Agt. A. A. Fleisher, Main and Rector St., Philadelphia, Penn.

✚**1616—Houston, Tex.**—The Harris County Government will receive bids until 10 a.m., Nov. 10, for furnishing the Harris County Boys School at South Houston and the Harris County School for Girls at Bellaire with coal as may be required during the coming season. Address County Audr. H. L. Washburn, Houston, Tex.

✚**1617—Brooklyn, N. Y.**—Bids will be received by the Borough of Brooklyn until 11 a.m., Nov. 11, for furnishing and delivering aproximately 3,300,000 lb. of anthracite coal to the various public buildings, courts and baths, delivery to be completed by the end of the current year. The bids will be awarded in a lump sum, and deliveries will be as required. Blank forms and complete details may be had on application. For data covering the previous award on this contract, see Vol. 6, p. 1009, Vol. 7, p. 108. Address, Pres. L. H. Pounds, Bureau Public Bldgs. and Offices, Room 1003, 50 Court St., for further information and address bids to L. H. Pounds, Room 5, Borough Hall, Brooklyn, N. Y.

1618—St. Louis, Mo.—St. Louis Dressed Beef and Provision Co. is receiving bids for furnishing 600 tons of screenings per week. Address, Pur. Agt. J. M. Weiser, 3919 Papin St., St. Louis, Mo.

1619—Pleasantville, N. J.—The Atlantic County Board of Freeholders received bids until 11 a.m., Nov. 4, for furnishing 200 tons of Lehigh Valley pea and 150 tons stove coal. Deliveries are to be made at Dolphin Sta. on the P. R.R., as required. The coal is for use at the Asylum and Almshouse. Address, Supt. T. L. McConnell, Pleasantville, N. J.

1620—Missoula, Mont.—The Missoula Light and Water Co., contract some time in December for their annual requirements of coal, involving approximately 9,000 tons slack and nut. Deliveries are made by railroad at the rate of from 300 to 1500 tons a month, and the company has storage capacity for 600 tons. Coal from the Roundup mines is supplying the present contract. Address, Pur. Agt. C. H. Christensen, Missoula Light and Water Co., Missoula, Mont.

1621—Columbus, Ohio—The Ruggery Building is in the market for approximately 300 tons of nut, pea and slack or coarse slack coal. Deliveries are to be at the rate of 50 tons per month during the winter months. Bids will be received on either Hocking Valley of West Virginia coal. For previous announcement of the old contract see contract 1, Vol. 6, p. 655. Address Supt. J. W. Lehman, 60 Ruggery Bldg., Columbus, Ohio.

+1622—Spokane, Wash.—The City Government will receive bids until 11 a.m., Nov. 18, for furnishing approximately 600 tons of coal as may be required during the ensuing year. Deliveries are to be in carload lots and slack, mine-run and Nos. 1 and 2 lump are required. Three separate bids are to be submitted, one to the Mayor, one to the City Clerk, and the third to the Purchasing Agent, and bids must be accompanied by a certified check for 10% of the amount bid. Address Purchasing Agent, City of Spokane, Spokane, Wash.

+1623—Lawton, N. D.—The Lillehoff School District will receive bids until Nov. 8 for furnishing Youghiogheny coal as may be required by the local schools during the ensuing year. Address Clk. H. W. Swanson, Lillehoff School Dist., Lawton, N. D.

Contracts Awarded

Note—Successful bidders are noted in **bold face type.**

+1388—Carlisle, Penn.—This contract (p. 447), which provides for furnishing the Carlisle School District with approximately 200 tons of standard Quemahoning coal, has been awarded to **J. E. Williams** at $3.30 per ton, delivered in the cellar. The distribution of the cost is as follows: Coal, $1.35; freight, $1.50; haulage, 45c. Address Chm. C. M. Liggett, Property Com., Carlisle, Penn.

+1503—Covington, Ind.—This contract (p. 577), which provides for furnishing Fountain County with coal, has been awarded to **Dick Sheaks** as follows: 200 tons for the County Farm, at $2.28 per ton f.o.b. the farm; 100 tons to the Court House, at $2.78; 60 tons to the Jail, at $2.65. Address Audr. Hyman W. Newlin, Fountain County, Covington, Ind.

1540—Davenport, Iowa—This contract (p. 617), which provides for furnishing the local Public Library with coal, has been awarded to the **Mueller Lumber Co.** at $2.93 per ton for 6-in. lump. There were six other bids on this business ranging from $2.94 to $3.25 per ton. Address Librarian, Davenport Public Library, Davenport, Iowa.

+1541—Scranton, Penn.—This contract (pp. 617, 699), which provides for furnishing the local Board of Education with proximately 2,000 bu. of mine-run coal to the high school, has been awarded to the **James J. Kearney Coal Co.,** at $2.40 per ton. Address Secy. G. E. Haak, School Bd., Administration Bldg., Scranton, Penn.

+1550—South Fork, Penn.—This contract (p. 660), which provides for furnishing the local School Board with mine-run coal as may be required, has been awarded to **Frank Hays** at $1.70 per ton. Address Secy. J. C. Penrod, Sch. Bd., South Fork, Penn.

+1552—Larksville, Penn.—This contract (p. 660), which provides for furnishing coal to the various local school buildings, has been awarded to **John Dwyer** on the following basis: Pea, $3.35; nut, $4.35; stove, $4, all per gross ton. Address Secy. Thomas Heffernan, Bd. of Edu., Larksville, Penn.

+1558—California, Penn.—This contract (p. 661), which provides for furnishing the local Public Schools with approximately 2,000 bu. of mine-run coal, has been awarded to the **Lilley Coal and Coke Co.** at 6½c. per bu. Address Secy. W. J. Weaver, California School Bd., California, Penn.

+1561—Le Mars, Iowa—This contract (p. 661), which provides for furnishing the Plymouth County Board of Supervisors with coal for the Court House, Jail and Poor during the year beginning Oct. 15, has been awarded to the **M. A. Moore Co.,** at $4.68 for Illinois lump. Other bids on this business were: Farmers Co., Lincoln County, 1¼x¾-in., for $4.45; same, lump, $4.95; W. F. Remer, Illinois lump, $4.85; Lambert Lumber Co., $5. Address County Audr. J. M. Hayes, Le Mars, Iowa.

+1562—Lewistown, Penn.—This contract (p. 661), which provides for furnishing and delivering anthracite coal as may be required at the various hose houses and town halls during the coming season, has been awarded to the **H. B. Montgomery Estate** on No. 2 coal at $5.40 per net ton. Address Secy. J. Harry Saxton, Lewistown, Penn.

1564—Cleveland, Ohio.—This contract (p. 661), which provides for furnishing the Outdoor Relief Department with coal as may be required during the ensuing year, has been awarded to the **Zettlmeyer Coal Co.,** at $2.94 per ton. Address Comr. A. R. Callow, Purchaser of Supplies, 511 City Hall, Cleveland, Ohio.

+1580—Fort Slocum, N. Y.—This contract (p. 700), which provides for furnishing the Government with coal for the steamer "General Barry" as may be required during the period beginning Nov. 1 of the current year, and ending June 30 next year, has been awarded to the **Commercial Coal Co., Inc.** (29 Broadway, New York City), at $3.39 per ton. This company was the only concern that submitted a bid for delivery in bins at Fort Slocum. Address Capt. S. E. Smith, Quartermaster Corps, U. S. Army, Fort Slocum, N. Y.

Contract Notes

San Diego, Calif.—About 25,000 tons of anthracite coal per annum is consumed for domestic purposes in this city. The average price is $12 per ton.

Pittsfield, Mass.—The City Government at this place consumes about 1,500 tons of anthracite coal which they buy locally on contracts. Address City Council, Pittsfield, Mass.

Piedmont, Ala.—The City of Piedmont consumes approximately 700 tons of bituminous mine-run per annum, which is bought at about $2 per ton. Address, Geo. H. Haslam, Piedmont, Alta.

Saxton River, Vt.—The Saxton River Woolen Co. consumes about 75 tons of coal per month. Deliveries are made by electric railroad and they have a storage capacity of 100 tons. Reynoldsville coal is being used on the present contract.

Trinidad, Colo.—The Trinidad Electric Transit Railway & Gas Co. consumes about 50,000 tons of bituminous coal per annum. The average price is about $1 per ton, and the present supplies are being furnished on a 10-year contract.

Boston, Mass.—Cocheco Woolen Mfg. Co. consumes about 200 tons of Georges Creek per month. They have a storage capacity for 1,200 tons and deliveries are made by rail. Address Pur. Agt. Samuel Rindge, 4 Winthrop Square, Boston, Mass.

Mt. Vernon, N. Y.—The Department of Public Instruction at this place buys about 1,700 tons of anthracite egg and pea coal. The call for bids is advertised and the business goes to the lowest bidder. Address E. Q. Bienvenu, Dept. of Pub. Instruction, Mt. Vernon, N. Y.

Bluffton, Ind.—The Bluffton Electric Light & Water Works consumes about 7,000 tons of nut and slack coal per annum. Purchases are made in the open market, and the usual price is about 65c. per ton. Address Supt. C. W. Clark, Bluffton Electric Light & Water Works, Bluffton, Ind.

Indianapolis, Ind.—The Indianapolis Light and Heat Co. consumes about 125,000 tons of Indiana mine-run and slack coal per annum. The present requirements are being filled on a 5-year contract at about $1.40 per ton. Address C. C. Perry, Indianapolis Light and Heat Co., Indianapolis, Ind.

Ft. Morgan, Colo.—The Municipal Light and Power plant at this place consumes approximately 3,300 tons of lignite slack and mine-run coal per annum. Purchases are confined to the open market, and the usual price is $2.10 per ton on track at Ft. Morgan. Address, Supt. Geo. G. Cox, Municipal Lt. and Water Plant, Ft. Morgan, Col.

Boston, Mass.—The contract for furnishing the City Hospital and the Calf Pasture Pumping Station with coal has been awarded to the **Northern Coal Co.** on New River coal at $3.89 for delivery at the City Hospital and $4.07 at the pumping station. The contract involves 12,500 tons and the complete list of bids made was as follows:

	City Hospital	Calf Pasture
New England Coal and Coke Co. (New River)	$3.97	$4.16
Metropolitan Coal Co. (New River)	4.09	
Gorman Leonard Coal Co. (New River)	4.10	
Darrow-Mann Coal Co. (New River)	3.98	4.16
Northern Coal Co. (New River)	3.89	4.07
Spring Coal Co., Long Branch and Willis Mines	3.82	4.19

For announcement of previous contract of the Metropolitan Water and Sewerage Board see contract No. 772, Vol. 7, Page 956. Address Secy. William N. Davenport, Metropolitan Water and Sewerage Board, No. 1 Ashburton Place, Boston, Mass.

Financial Department

Consolidation Coal Co.

This company reports in substance, for the fiscal year ended Dec. 31, 1914, as follows:

The shareholders on Jan. 30, 1915, authorized an increase of $8,000,000 in the limit of issue of capital stock and also an issue of $7,000,000 7% 2-year debentures, with interest payable only upon the maturity of the principal and convertible (*a*) at maturity Feb. 1, 1917, at company's option, principal and 14% interest, into capital stock or (*b*) prior to maturity at holder's option at par and interest to date of conversion as part subscription for an amount of new stock equal to 114% of the bonds held by him. The issue has been underwritten by New York bankers.

Coal Mined by the Company and Its Subsidiaries, by Divisions

	Maryland	West Virginia	Pennsylvania	Mill Creek	Elkhorn	Total Gross	Net Tons
1914.	1,992,342	4,160,041	1,777,355	495,950	1,136,827	9,562,515	10,710,017
1913.	2,127,131	4,656,640	1,743,536	459,202	973,302	9,959,811	11,154,989
1912.	2,162,996	4,576,484	1,748,091	522,900	228,011	9,238,482	10,347,100
1911.	2,178,391	3,925,329	1,671,639	456,544	.....	8,231,903	9,219,731

The coal mined by lessees in the Maryland, West Virginia and Pennsylvania divisions aggregated 537,568 net tons, against 537,871 in 1913.

RESULTS FOR YEAR ENDING DEC. 31 (INCLUDING SUBSIDIARIES)

	1914	1913	1912	1911
Coal mined	9,562,515	9,959,811	9,238,482	8,231,903
Coke manufactured	58,202	76,050	62,647	43,740
Coal mined by lessees	479,971	480,242	536,401	473,008
Gross earnings (mining)				
Int. and divs. on sec. owned	$14,828,981	$15,443,246	$13,708,564	$11,420,694
			811,853	311,431
Total gross earnings	$14,821,981	$15,443,246	$14,520,417	$11,732,125
Operating expenses			9,896,157	x8,467,662
Taxes			220,215	222,194
Interest and exchange	$11,022,090	$11,281,655	62,092	22,437
Insurance			39,424	41,803
Royalties			212,847	172,343
Deprec. mining plant			247,508	221,618
Deprec. misc. equipment	414,245	334,888	95,284	78,999
Total	$11,436,335	$11,616,543	$10,773,527	$9,227,056
Net earnings	3,392,646	3,826,703	3,746,890	2,505,069
Int. on Cons. Coal bds.	1,113,576	1,085,894	639,225	517,084
Int. on sub. cos. bonds			334,858	355,926
Sink. fd. cons. coal bds	167,633	174,120	162,958	153,618
Sink. fund sub. cos. bds	101,704	106,960	106,492	94,605
Cash dividends (6%)	1,500,000	1,500,000	1,358,865	1,201,513
Total deductions	$2,882,913	$2,866,974	$2,602,398	$2,322,746
Balance, surplus	509,733	959,729	1,144,492	182,323

x Cumberland & Pennsylvania R.R. depreciation amounting to $108,230 in 1911, and insurance, $3,544, is charged to operating expenses in accordance with Inter-State Commerce Commission classification.

COMBINED GENERAL BALANCE SHEET, DECEMBER 31

Assets	1914 $	1913 $	Liabilities	1914 $	1913 $
Property accts. a	52,117,956	51,333,115	Capital stock	31,190,500	31,190,500
Adv. payments on coal land pur.	1,797,075	1,569,900	Bonded debt	23,112,000	22,729,000
Due from 1st and ref. mtge. trus.	b89,685	240,339	Convertible 6s	6,500,000	6,500,000
Stock reserved for convers'n of 6s secured bonds	6,190,500	6,190,500	Car trust bonds—assumed by C. & P. R.R.	304,000	380,000
Stocks of allied cos c	906,888	3,906,888	Purchase money obligations	2,615	5,995
Other investments	306,007	116,400	Bills payable	2,200,000	950,000
Sinking funds	821,614	806,926	Accounts payable	582,633	430,431
Bonds in treasury	708,000	.....	Pay-rolls	183,029	205,477
Coal and coke	526,224	490,969	Royalties payable	77,346	223,574
Mat'ls. supp., etc.	1,081,638	1,416,680	Bond interest and dividends due	50,331	49,536
Bills receivable	319,055	200,480	Bond int. accrued	395,246	399,393
Accts. receivable	5,636,397	4,847,662	Sinking funds accrued	128,235	142,658
Cash in banks, etc.	1,155,228	1,770,806	Dividend payable Jan. 31	375,000	375,000
Cash for bond int. and divs. due	50,331	49,536	Individuals and companies	468,578	806,888
Special deposits to cover royalties	76,243	222,503	Profit and loss	d9,213,328	8,774,252
Total	74,782,841	73,162,704	Total	74,782,841	73,162,704

a Property account ($52,117,956) includes: Coal lands and other real estate, $35,291,198; less reserve for exhaustion, $3,149,014; balance, $32,142,184; mining plants and equipment, $18,994,333; less reserve for depreciation, $3,424,949; balance, $15,569,384; Cumberland & Penn. R.R., $3,299,696; less sinking fund for redemption of bonds, $819,627; balance, $2,480,069; Cumberland & Penn. R.R. equipment, $1,885,734; less reserve for depreciation, $656,752; balance, $1,228,982; floating equipment, $1,191,844; less reserve for depreciation, $494,507; balance, $697,337.

b For 75% of cost of improvements, extensions, etc., $75,368, and for expenditures on Northern Coal lands, $14,317; total, $89,685.

c Stocks of other companies owned include 18,900 shares Northwestern Fuel Co. common stock, 5,400 shares Northwestern Fuel Co. pref. stock and 7,513 shares Metropolitan Coal Co. common stock. Of the above, 5,000 shares of M. C. Co. stock and 18,000 of the N. W. F. Co. common stock, together with $6,500,000 1st and ref. M. bonds, are held by Equitable Trust Co. of New York, trustee, as collateral for convertible 6s.

d After deducting $70,657 adjustment of accounts of previous years.

Note—For previous annual report of this company see Vol. 6, p. 168.

The Pacific Coast Co.

This company reports under date of Aug. 27, 1914, as follows:

The past fiscal year has been one of business depression at all points and in all lines of business along the Pacific Coast. There are not as yet signs of any general improvement. Crop conditions and bank deposits are favorable for an improvement during the present year, if other influences do not interfere.

Operating expenses have been reduced as far as consistent with efficient maintenance of the properties. No expenditures for improvements are being made, with the exception of such as are necessary to finish up improvements started during previous years.

PACIFIC COAST COAL CO. (Coal Department)

Gross earnings (decreased)	$320,920.93
Operating expenses (decreased)	149,413.82
Net earnings (decreased)	171,507.11

The total output of the mines during the year was 681,729 tons, which includes 18,240 tons from mines under development; a decrease of 134,875 tons as compared with last year.

The amount of coal sold at all depots was as follows:

From company's mines, tons	657,024
Other domestic coal, tons	32,502
Foreign coal, tons	11,209
Total coal, tons	700,735

a decrease of 155,765 tons as against last year.

The average cost of output from company mines increased 20.6c. per ton. The average selling price increased 16.3 cents per ton.

Note—For previous annual report of this company see Vol. 5, p. 390.

Nova Scotia Steel & Coal

The report of the Nova Scotia Steel and Coal Co. for the year ended Dec. 31, 1914, compares as follows:

	1914	1913	1912	1911
Gross profits	$415,164	$1,255,954	$1,000,610	$1,019,392
Bd. and other int.	601,070	505,135	412,311	351,169
Deficit	185,906	750,819	588,299	668,223
Other charges	213,313	233,132	201,843	217,881
Pfd. divs.	41,200	82,400	82,400	82,400
Com. divs.	180,000	360,000	360,000	360,000
Deficit	620,419	75,287	55,944	7,942
Prev. surp.	527,887	452,600	508,544	500,600
Tr. fr. gen. res.	150,000	.....	.....	.....
P. & L. surp.	57,466	527,887	452,600	508,544

Note—For previous annual report of this company, see Vol. 5, p. 712.

DIVIDENDS

The following is a list of some of the more important dividends recently announced:

New Central Coal—Dividends of 1%, payable Nov. 1, to holders of records, Oct. 28.

Westmoreland Coal—Dividend of $1.75, payable Oct. 1, to holders of records Sept. 22 to Oct. 1.

Temple Coal Co.—Regular quarterly dividend of 2%, payable Oct. 12, to holders of records Oct. 2.

Pittsburgh Coal Co.—Regular quarterly dividend of 1½%, payable Oct. 25, to holders of records Oct. 15.

Consolidation Coal—Regularly quarterly dividend of 1½%, payable Oct. 30, to holders of records Oct. 23.

Lehigh Valley Coal Sales—Regular quarterly dividend of 2½%, payable Oct. 16, to holders of records Oct. 7.

Alabama Fuel & Iron—Regular quarterly dividend of 1%, payable Oct. 1, to holders of records, Sept. 21 to Sept. 30.

Reading Co.—Regular quarterly dividend on the first preferred of 1%, payable Dec. 9, to holders of records, Nov. 23.

Delaware, Lackawanna & Western Coal—Regular quarterly dividend of 2½% payable Oct. 15, to holders of records Oct. 1.

Central Coal & Coke Co.—Regularly quarterly dividend or erly dividend of 2½% payable Oct. 15, to holders of recor Sept. 30.

Island Creek Coal—Regular quarterly dividends of 50c. o the common, payable Nov. 1, to holders of records Oct. 23, an $1.50 on the preferred payable Nov. 1, to holders of record Oct. 24.

Burns Bros.—Regular quarterly dividends of 1¾% on th common, payable Nov. 15, to holders of records Nov. 1, an regular quarterly (No. 11) on the preferred of 1¾% pay able Nov. 1, to holders of records Oct. 15.